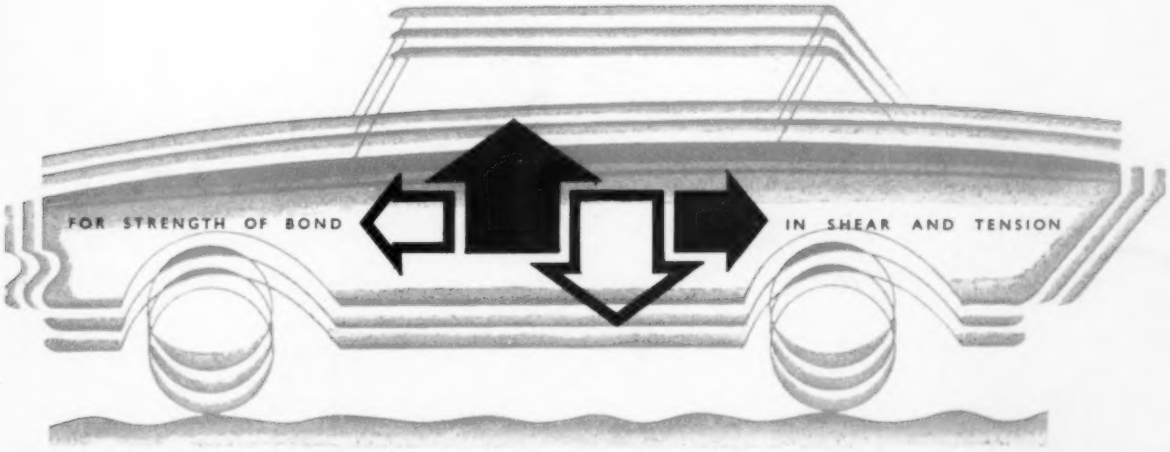
Rubber Journal and International Plastics

VOL. 139 NO. 12 SEPTEMBER 17 1960 Price 1s. Weekly

TY-PLY

RUBBER TO METAL BONDING AGENTS



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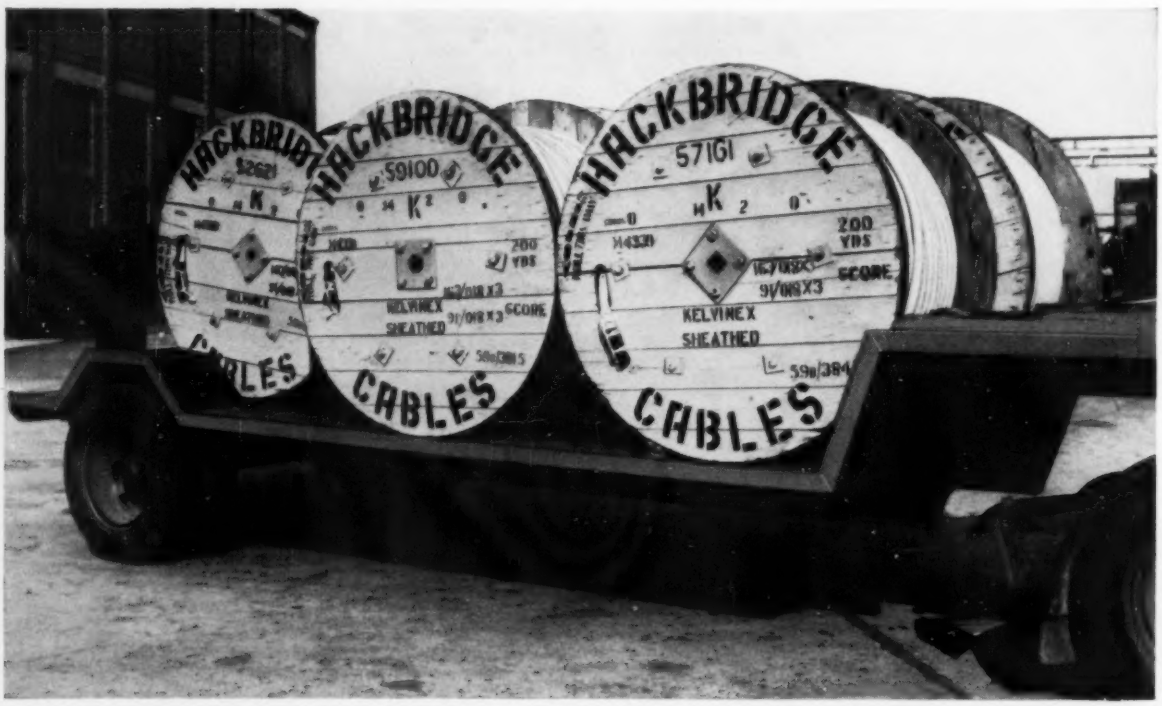

Loading 'Kelvinex' sheathed cable at Hackbridge Cable Co. Ltd., Kelvin Works, Hackbridge, Surrey, for delivery to the mine.

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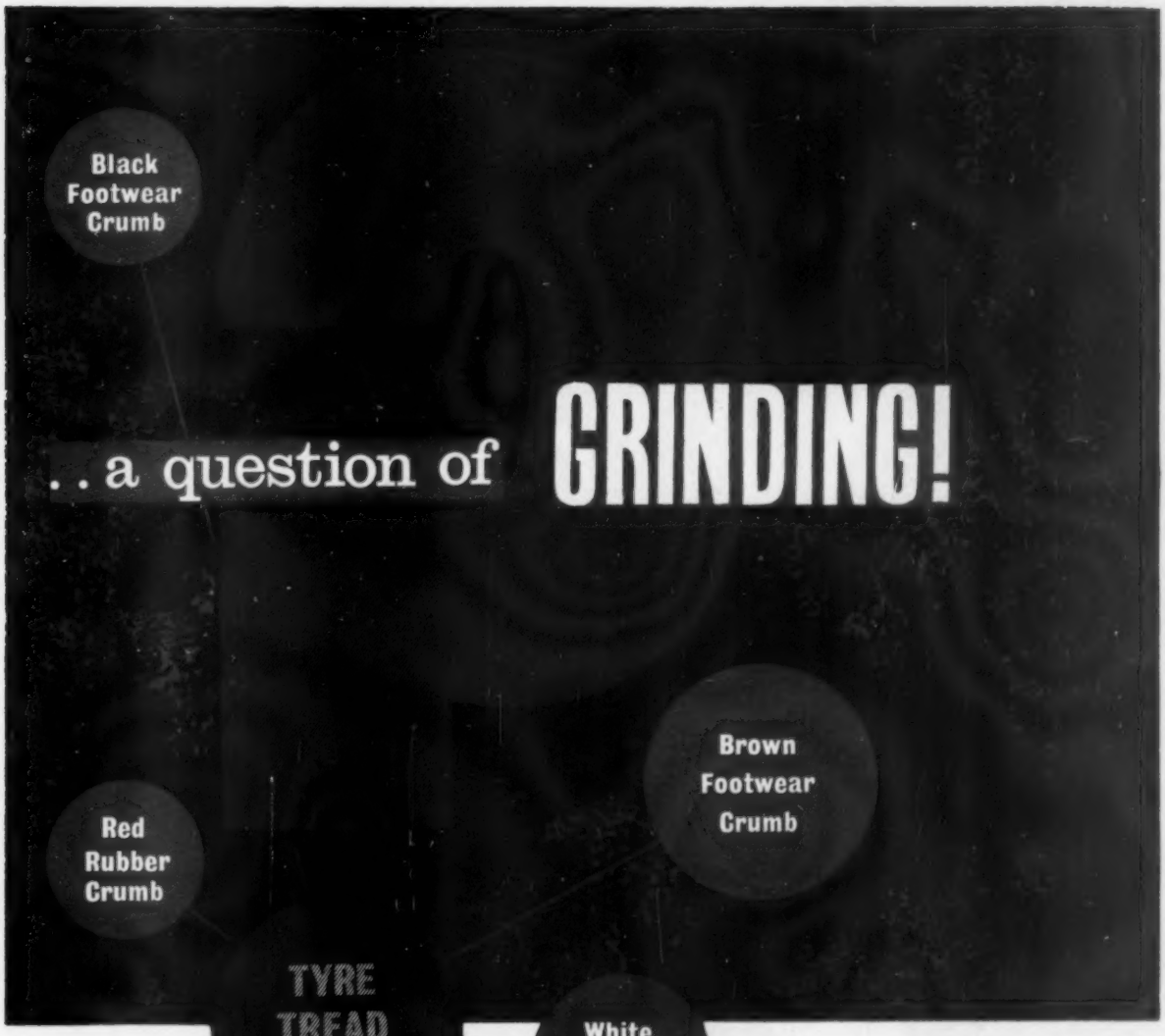

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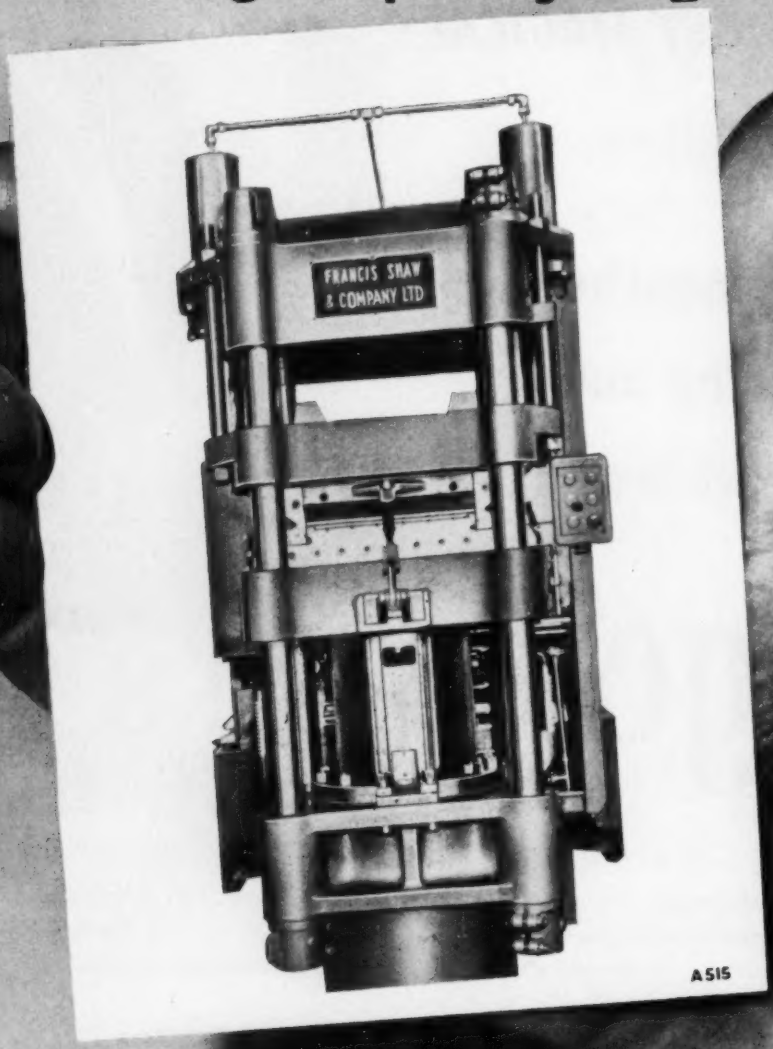

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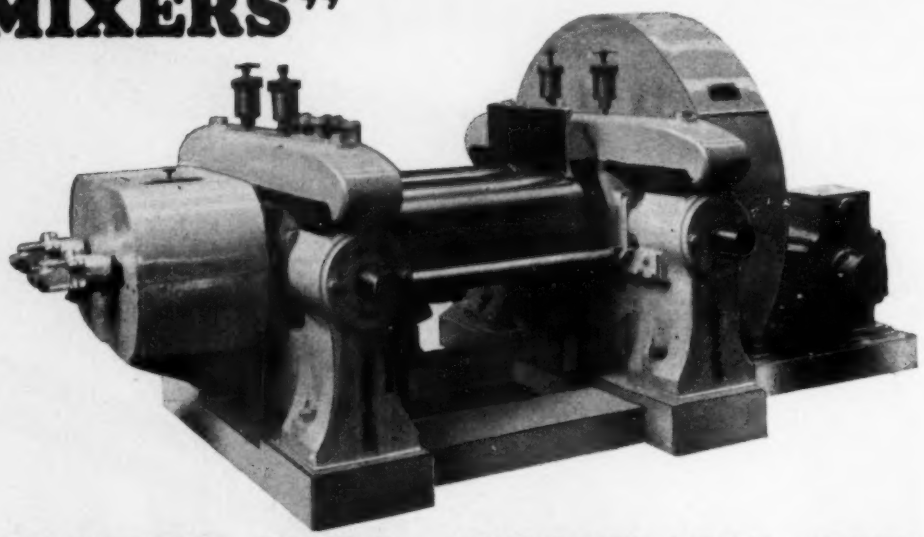

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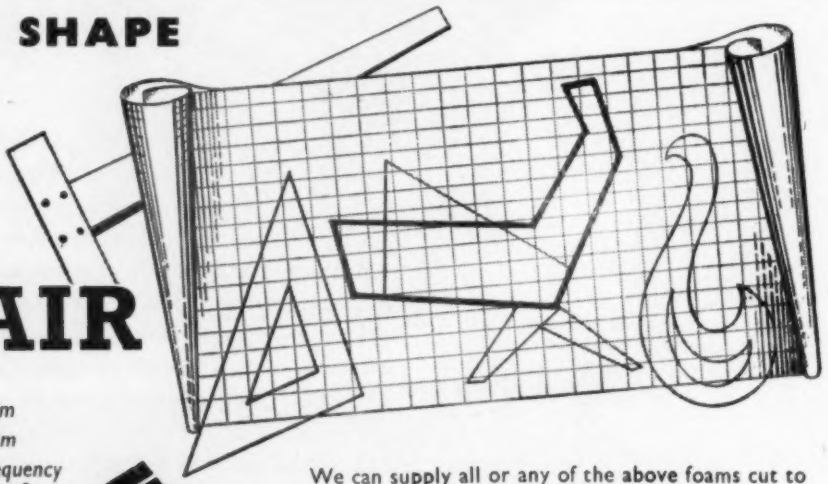

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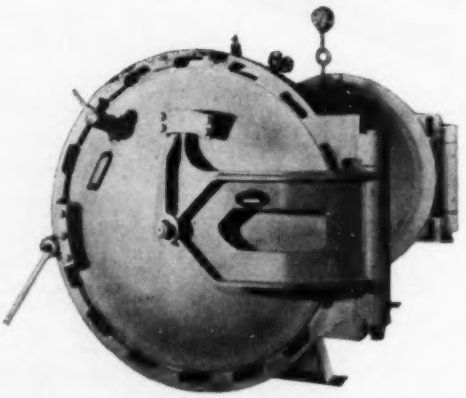

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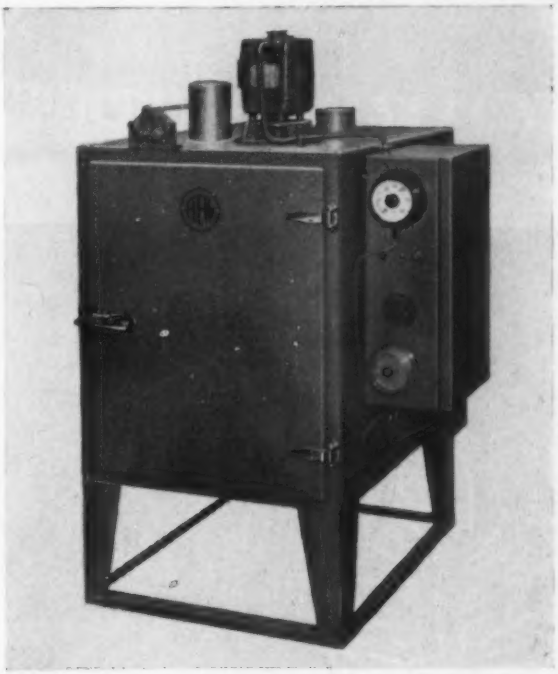

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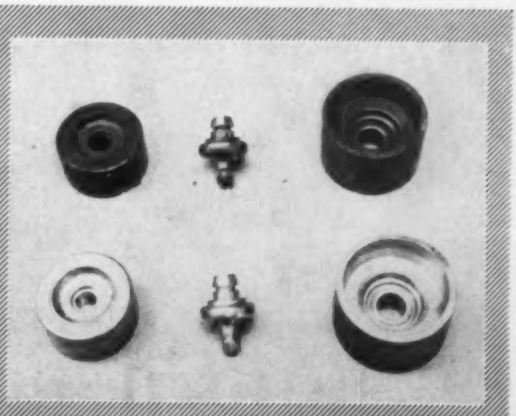

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IN ITS 77th YEAR

September 17 1960

Editorial

NOTES OF THE WEEK 409

Articles and News

NEWS BRIEFS 410
BIGGEST EVER NATURAL CONFERENCE 412
FOAMING CAPACITY OF RUBBER LATEX 415
NEWS ABOUT MACROPLASTIC 422
BRITISH EQUIPMENT FOR RUSSIA 425
EXHIBITION PREVIEWS 426
ACCIDENTS IN THE POLYMER INDUSTRY 433
PLASTICS MATERIALS SALES 435

Features

VIEWS AND REVIEWS 418
MEN AND MATTERS 429
QUESTION CORNER 430
RUBBER STATISTICS 435
PATENT SPECIFICATIONS 436
PLANTATION SHARE SURVEY 437
RUBBER MARKETS 438
INDUSTRY INTELLIGENCE 439
TRADE MARKS 440

Classified Advertisements . . . 441 Advertisers Index . . . 444

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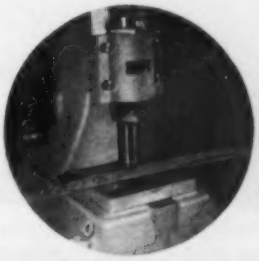

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NOTES of the WEEK

The Price of Natural

RUSSIAN buying on the London rubber market, although the quantity reported is small, again points the fact that over the last three months the Spot price of rubber has dropped by near enough one shilling a pound. It is also interesting to note that the Spot price quoted last week in *RJIP*, 28⅞d. to 29⅛d., is close to the price of 28d. which last year the Russians suggested was a normal price for natural rubber. The decline in rubber prices has caused no surprise to anyone, and must indeed be welcomed by growers for they could not, in their own interests, have wished to prolong a situation where general-purpose synthetics were being sold at not far off half the price of natural.

Something of the effect of Russian buying can be gauged from the figures for shipments of natural rubber from Malaya. For the first six months of 1959, Malaya shipped 92,668 tons to Russia. For the corresponding period of this year, the figure was 16,600. The figures for the first six months of 1960 show also the growing importance of Europe as a market for Malayan rubber. For the first six months of 1959, Europe, including the UK, imported from Malaya 208,358 tons of natural. The figure for the first six months of this year was 248,540 tons. Of this, UK imports rose 12,000 tons to 69,860; West German imports rose by 11,000 tons to 41,270, while the rest of Europe took 17,000 tons more than in the first half of 1959. This is an interesting reflection on the considerably increased industrial output, particularly in the Common Market, and stresses once more that the outlook for natural rubber exports to Europe looks set fair for some years to come.

Accidents

THE number of reported accidents in factories in 1959 rose to 174,071 as against 167,697 in 1958. By contrast, the number of fatal accidents last year was 598, the lowest this century. These figures are recorded in the annual report of H.M. Chief Inspector of Factories published last Tuesday.

In the rubber manufacturing industry there were 1,864 reported accidents, of which five were fatal. The industry's accident frequency rate was 1.27. Reported accidents in plastics moulding and fabricating totalled 605 with a frequency rate of 1.45. None were fatal. There were 618 reported accidents in plastics materials and man-made fibre production, of which one was fatal. It is interesting to note that, of the totals, accidents to hands and wrists numbered 587 in the rubber industry and 405 in the plastics moulding and fabricating industry. In his report the Chief Inspector draws attention to the large number of accidents to hands and wrists, as well as ankles and feet (417 in the rubber industry) and points out that much can be done to reduce these accidents by wearing suitable protective clothing. 'Careful attention to these simple matters,' he said, 'would reduce dramatically the grand total of all reported industrial accidents.'

The increase in the number of accidents to young persons, from 9,838 in 1958 to 11,001 in 1959, is a disturbing feature of the report. It is stated that this rise is not due to a rise in the numbers employed. The Chief Inspector, Mr T. W. McCullough, states, 'This is a clear indication that, as increasing numbers of school leavers enter industry in the coming years, redoubled efforts will be necessary if the rate of accidents to young people is to be held in check. The present drive to train young persons in safe working must be intensified, not only by industry, but by secondary and technical schools and colleges.'

Among specific mentions in the report (an account of which will be found elsewhere in this issue) is the use of disc brakes and disc clutches on two-roll mills. Recent trails using both types have shown that the remarkably short braking distance of 1in. travel on the roll surface can be achieved—if the gearing and transmission will stand up to the stresses involved. The need to take extra precautions with protective coatings, such as epoxy resins in tanks, is stressed. Much the same problems are encountered when flexible containers for use as oil barges (as for instance the Dracone) are in course of manufacture. Workers inside these cylinders have to use toxic flammable solvents when cementing the synthetic rubber lining in place and special precautions are necessary. The report (CMD 1107) is obtainable, price 7s. net, from H.M. Stationery Office.

Plastics Sales

SALES of plastics materials for the second quarter of 1960, at 143,107 tons, show a 12% increase over the corresponding quarter of 1959 but are some 3,000 tons less than the figure for the first quarter of this year when a new high was recorded. The six months figure, at 289,500 tons, is some 48,000 tons above the halfway figures for 1959. If sales spurt to the same extent as they did in the second half of 1959, there is a sporting chance that the 1960 sales total will reach 600,000 tons. The odds, however, are against, even though stocks have been building up and now stand at 76,000 tons for all plastics materials, of which over 56,000 are thermoplastics.

NEWS *Briefs*

UK PLASTICS FIRMS DISPLAY AT ZAGREB
DOW PLASTICS SERVICE IN ITALY — CEYLON SELLS RSS TO CHINA—RAVENNA BLACK PLANT

●**Japan** — Under a plan recently submitted to the Ministry of International Trade and Industry, Tao Nenryo Industrial Company plans to enter the petrochemical manufacturing field by 1962. The company will establish a petrochemical subsidiary with an initial capitalization in excess of $5m. New plant to be located in Kawasaki, Kanagawa Prefecture, will have main emphasis on production of ethylene and propylene. Oil to be consumed by the two proposed undertakings is estimated at approximately 330,000 tons per year.

●**Dominica** — The Government is encouraging the planting and production of rubber. So far, there are some 60,000 rubber trees, two and three years old. It is expected that local consumption will be met by production in two or three years.

●**Venezuela** — An executive of Goodyear de Venezuela stated recently that the company had shipped 800 car tyres to the USA, which is thought to be the first commercial quantity of tyres shipped from Venezuela. The Goodyear plant's output has been growing steadily in the first six months of this year, exceeding 110,000 units as compared to 180,000 in the whole of 1959.

●**Hungary** — Transelektro has sold $100,000 of ASCR cables to Pakistan and Brazil.

●**Ceylon** — Official sources here said recently that negotiations between Ceylon and China were proceeding over exports by Ceylon of an extra 5,000 tons of rubber under the trade agreement between the two countries. An agreement earlier this year stipulated that Ceylon would export 17,000 metric tons of rubber in exchange for 160,000 metric tons of rice.

●**United States** — Polymer Industries inc., producer of industrial adhesives, rubber cements and textile specialty polymers, and a subsidiary of Philip Morris Inc., has officially opened its recently-completed million-dollar plant expansion.

●**United Kingdom** — Exports from the UK of rubber products other than tyres during the first seven months of 1960 were more than £1,000,000 higher than during the same period in 1959. This represents an increase of over 10%. The figures are: 1959, January-July, £9,493,252; 1960, January-July, £10,500,979.

●**Italy** — Dow Chimica Italiana S.p.A. has announced the establishment of a plastics technical service covering the European area. The new technical service operations, it is said, will assist users of Dow plastics materials in their proper application and in manufacturing techniques. A new Styron production plant is now under construction near Leghorn, Italy. Dow's Italian subsidiary has its headquarters in Milan.

●**Denmark** — Tidewater Oil, which will have an oil refinery in operation at Kalundberg from autumn next year, may set up a petrochemical plant alongside the refinery. Discussions are taking place at the moment with two firms, one of which is reported to be a West German concern.

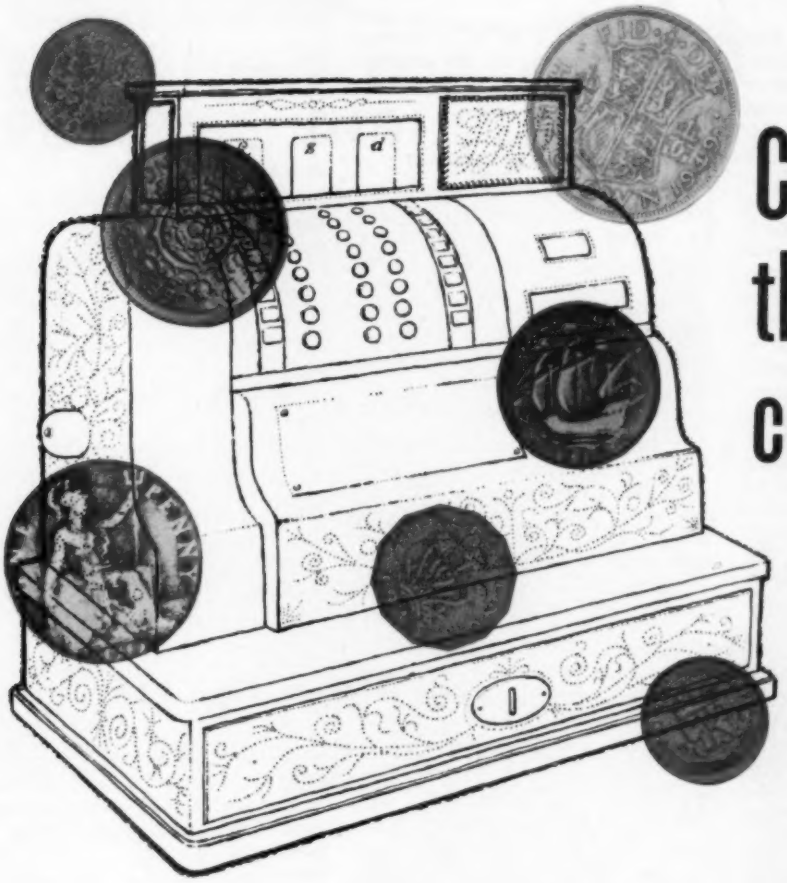
●**Yugoslavia** — A number of UK plastics firms are taking part in a British display at the Zagreb International Fair, which is now on and runs until September 25. I.C.I. Plastics division is promoting Perspex, Alkathene, Propathene, Butakon and other materials. A wide range of products — including ceiling panels — is being displayed by Storeys, and Francis Shaw are exhibiting an extruder.

●**India** — A substantial increase in the production of polyamides is expected when several units now being planned come into operation. The projects involve the manufacture of monofilaments, extrusion and moulding compounds and, at a later stage, a caprolactam plant with a capacity of 12 tons a day.

●**Italy** — The official opening of the new Cabot Italiana carbon black plant at Ravenna will take place on October 19.

●**India** — The Government have decided that the statutory price of raw rubber is to be maintained at 155.75 rupees per 100lb. inclusive of cess and sales tax. As a result of several representations received from the industry, the Government had asked the Tariff Commission, in April 1959, to undertake a fresh enquiry with a view to revising the price of raw rubber.

'Yeah, I liked that part and I liked the bit where he upset his carafe of water all over his notes!' — 502



Counting the cost

Some non-staining antioxidants may seem expensive in terms of purchase price per lb.—but this ignores the question of technical efficiency.

Calculating in terms of cost per unit of technical efficiency, a higher cost per lb. can well result in a lower cost per unit. A high degree of protection can only be achieved with an antioxidant of high technical efficiency. Further, an antioxidant of *high* technical efficiency can be used in *appropriate* dosages to obtain just the degree of protection required.

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Biggest Ever Natural Conference

250 DELEGATES AND 80 PAPERS AT KL

OVER 250 delegates have now registered for the biggest international conference on natural rubber ever to be held — the Natural Rubber Research Conference at the headquarters of the Rubber Research Institute of Malaya in Kuala Lumpur.

The conference, which begins on September 26 and ends on October 1, is said by the Natural Rubber Bureau in London to be 'a further reflection of the determination of the Malayan Government and natural rubber interests to make the industry one of the most progressive in the world.'

Some 80 papers will be presented by scientists and technologists from research organizations, commercial firms and rubber institutes from many parts of the world. There will be two concurrent sessions: one will cover research on the production of natural rubber, the other research on the preparation and use of natural rubber and latex.

Three General Sessions

There will also be three general sessions addressed by guest speakers who include Professor G. E. Blackman, F.R.S., of Oxford University, Professor James Bonner of California Institute of Technology, and Professor Geoffrey Gee of Manchester University.

The conference is sponsored by the Federal Government of Malaya and the Rubber Producers' Council and will be formally opened by the Minister of Commerce and Industry of the Federation, Enche Mohamed Khir Bin Johari.

The proceedings of the conference will be published by the Rubber Research Institute of Malaya next year.

Plastics Slow-down

After the record start to the year, plastics sales during the second quarter slowed down — but the figure was still 12% up on 1959. As the rate of production remained about the same, stocks rose sharply in the period. *Full figures are given on page 435.*

Mixers to Holland

Following a trade delegation's visit to the Revertex foam rubber factory at Harlow, where members of the delegation saw mixing machines in action, three Peerless and Ericsson Q80 mixers with capacities of 70qts. dryweight have been purchased for a factory to be opened in Holland.

POLYPROPYLENE PROJECT IN HOLLAND

BATAAFSE Petroleum Maatschappij and Montecatini of Milan are to form a joint company in Holland, as briefly reported in *RJIP* September 10. The firm's first venture will be the 'large-scale' manufacture of polypropylene, and plant for this project will be erected at Rotterdam.

The plant will be erected in conjunction with the works of Shell Nederland Raffinaderij.

Royal/Dutch Shell Patents, as well as those of Montecatini, will be used in the new plant. In the initial period, sales will be restricted to the Benelux countries, and will be handled by Shell through its existing organization.

Montecatini licensed I.C.I. last month (August 30) for the production of polypropylene fibres, this being additional to agreements already concluded on polypropylene in other forms. I.C.I.'s polypropylene plant at Wilton is due to come on stream shortly.

Latices Plant for UK

US RUBBER AND WITCO JOINT VENTURE

WITCO Chemical Co. Inc. and United States Rubber Co. have jointly announced that they propose to form a new chemical company, Sto-Chem Ltd., to produce synthetic rubber latices in the UK (*RJIP*, September 10, 401).

The new company, to be jointly owned by the two concerns, is to acquire a 20-acre site in the Midlands. By the autumn of 1961 Sto-Chem expects to have new plant, with an initial capacity of 8m. lb. in operation. The total investment will be in the region of £1m.

A complete line of butadiene-styrene, high styrene, nitrile and acrylic types of latex will be manufactured.

George R. Vila, a group vice-president of US Rubber, will be the chairman of the new company. Douglas Roberts, who has been manager of manufacturing for Witco's UK operations, will leave that post to become general manager. Distribution of Sto-Chem's output will be handled exclusively by Witco Chemical Co. Ltd., Witco's wholly-owned UK subsidiary.

Technical assistance for the design and construction of the plant will be provided by US Rubber's Naugatuck Chemical division. When the plant goes on stream, it will produce formulations under a licence granted by Naugatuck Chemical, and the division will also aid in technical service work. Naugatuck Chemical has been prominent in the latex industry since the early 1930s, and its research staff was among the pioneers in the field of synthetic latices.

Witco Chemical Co. Ltd. has production facilities and laboratories at Droitwich, with various sales offices in the UK. Its European sales outlets include branch offices in Rotterdam, and a wholly-owned subsidiary in France.

Russia Switches to London

Singapore rubber dealers said on September 9 that they believed Russia was buying rubber from London for October shipment and avoiding Singapore for fear of pushing up the price.

One estimate put the order at 2,000 tons.

EFP President

The European Federation of Purchasing has chosen a well-known figure in the rubber world as its new president — T. L. Garner.

Mr Garner, who is chairman and managing director of Precision Rubbers, of Bagworth, Leicestershire, is also a director of John Bull Rubber.

Replanting Speed Up

Malaya's rubber smallholders are replanting at a greater rate than ever, according to a report presented to the Malayan Parliament on September 12.

The report shows that smallholders replanted 76,725 acres in 1959. A total of 21,750,951 Malayan dollars was refunded to estates last year from the replanting cess which had been collected from them.

BRIDGE FARREL

EQUIPMENT FOR THE PLASTICS INDUSTRY

(Illustrated below)

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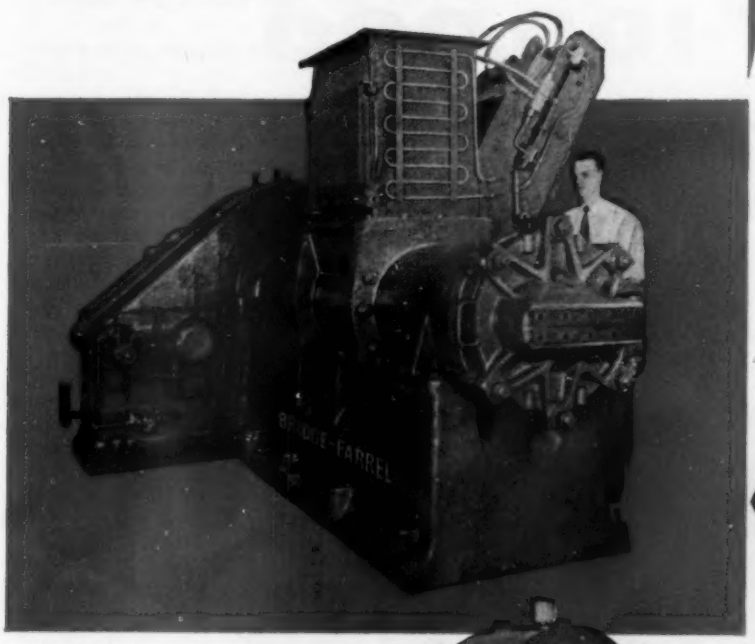

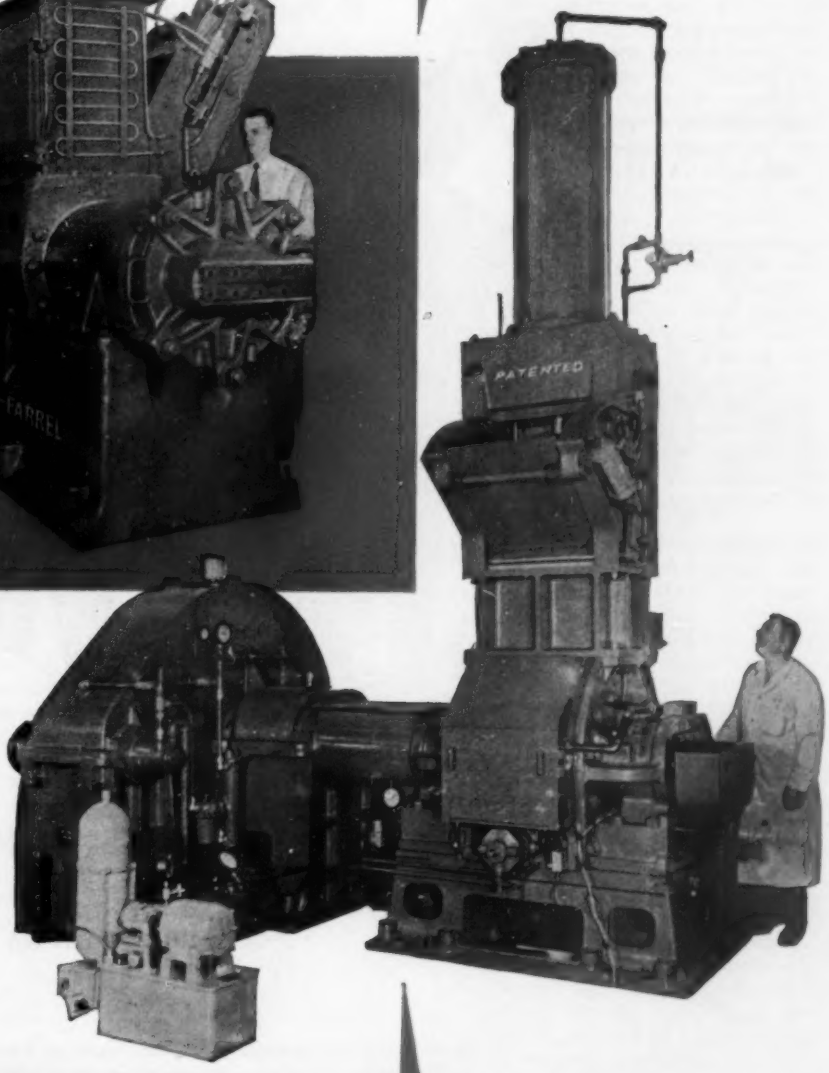

(Illustrated above)

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BEHIND THE DUNLOP SYMBOL

Ten thousand men and women work at Fort Dunlop, mainly on tyre production. At Great Chesterford in Essex a factory of 50 people produces table-tennis equipment and dartboards. At Bankstown in Australia, 12 miles from Sydney, 1,000 people make rubber footwear. In Malaya and Nigeria 14,000 are employed on Dunlop plantations.
All these people, with their colleagues in many other countries, are the life-blood of the Dunlop organisation . . . the most valuable assets of a vigorous forward-looking company.

DUNLOP SYMBOL OF PROGRESS

CPH/PRS/51

Foaming Capacity of Rubber Latex

By D. M. SANDOMIRSKII AND A. A. KOROTKOVA*

SUMMARY

In the production of air foams from SKS butadiene-styrene rubber latex the foaming capacity of the latter is characterized by the product of the foam volume and the time from formation of the foam until its destruction (Vt cu. cm. sec.). The decisive factor in the stability of such foams from a concentrated latex is the viscosity of the latex. In a more dilute latex (25 to 30%) the foaming capacity is determined first of all by the surface tension, increasing with decrease of the latter.

ONE of the most important stages in the production of sponge rubber from rubber latex is the foaming of the latex mix., *i.e.* its conversion into a foam from which the vulcanized sponge rubber is formed after gelatinization and vulcanization. The latex foam must possess a complex of properties and, in the first place, it must be sufficiently stable so as not to be destroyed by the action of electrolytes upon it during gelatinization or by the high temperatures of vulcanization.

In the literature there are a very large number of papers devoted to investigation of foams from molecular and colloidal solutions of surface-active substances[1-3], but there is a complete absence of analogous investigation on latex foams. The published investigations of the process of production of sponge rubber from latices touch on the description of the technological processes, the equipment required and the properties of the finished article[4]. Only recently has work been published dealing with the stability of latex foams[5].

Rubber latex is a polydispersed system, in which the dispersion medium is a solution of colloidal, semi-colloidal and molecular-soluble substances, the disperse phase consisting of globules of rubber with a layer of surface-active substances adsorbed upon them. In the case of a latex mix, there are also particles of compounding ingredients in the system. The process of foam-formation in such a complex system and the properties of the resulting foam are bound to differ considerably from those which hold good in the case of a solution of surface-active substances.

The present paper is devoted to an investigation of the stability and other properties of latex foams. In this communication we present certain results obtained in the investigation of the foam-forming capacity of butadiene-styrene latices. Analogous data were obtained for a number of other synthetic latices, so that they have quite a general character.

As a criterion of the foam-forming capacity of the latex we first used Dumanskii's proposal[2] of the limiting height of a column of foam h_∞ reached at the beginning of its destruction. If the period of life of one bubble of foam is equal to τ, then for a velocity of the air passing into the fluid through a capillary equal to u, the accumulation of foam will proceed up to the formation of a column of foam of height

$$h_0 = u\tau$$

It is evident that the height h_∞ depends upon the properties of the system and may be used as a characteristic of the foam-forming capacity.

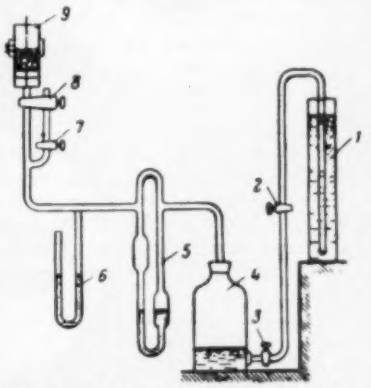


Fig. 1. Apparatus for investigation of the foam-forming capacity of latex

Foam formation in the latex up to the beginning of the destruction of the foam is effected in the apparatus shown in Fig. 1.

From the 250ml. measuring cylinder, filled to above the top gauge mark, water passes at a definite velocity, regulated by the tap 2, through the open tap 3 into the bottle 4 and drives the air out of the bottle. The velocity of the air is measured by the rheometer 5, and the pressure by the manometer 6. The tap 7 is used to adjust the apparatus to a definite velocity of air. The barrel of the tap 8 has two perpendicularly arranged apertures corresponding to the two arms of the tap. The left arm of the tap, terminating in a capillary, leads to the stopper of the vessel for foaming 9, the right hand one communicates with the atmosphere.

To adjust the apparatus to the necessary velocity of air the key of the tap 8 is placed in such a position that the left aperture is closed and the right hand one open. By regulating the velocity of the water passing from the measuring cylinder 1 into the bottle 4, and by turning the regulating tap 7, it is possible to establish from the rheometer 5 the necessary velocity of the air in the apparatus with a pressure corresponding to the resistance of the layer of the liquid under investigation in vessel 9.

In carrying out the experiments we established as a preliminary the required velocity of air in the apparatus before the water from the measuring cylinder reaches to the top gauge mark. At the instant when the water in the cylinder reaches the gauge mark, the key of the tap 8 is turned rapidly and the air directed in the vessel for foaming 9. At the same time a stop watch is started. Thereupon foam-formation begins, which finishes as soon as the first two or three bubbles burst in the surface layer of foam. At this instant the tap 3 is turned off and the stop watch stopped. In this way we measure the time of foam-formation before the beginning of destruction from the stop watch and the volume of the foam formed in this time from the volume of water which has flowed out of the measuring cylinder.

It is evident that the volume of the foam produced is equivalent to the limiting height h_∞.

The production of foams from various latices and various rates of air showed that the limiting volume of foam is not a well defined value for the system in question, since it depends markedly upon the velocity of the air. The higher the velocity of the air the greater the volume of foam which may be produced before the

*D. M. Sandomirskii and A. A. Korotkova, N.I. Inst. Rezin i Lateks, Moscow (Koll. Zh., 1959, 21, No. 6,679 - 85); Research Association of British Rubber Manufacturers' Translation No. 832 by R. J. Moseley.

beginning of destruction and the more rapidly the foam will be destroyed.

In Table 1 we give results obtained in foaming SKS-30 butadiene-styrene latex of various concentrations and of a solution of Nekal (the emulsifier in this latex) and various velocities of air.

As may be seen from Table 1 the product of the limiting volume of foam V and the time t (Vt), necessary to reach it (equal to the life of a single bubble of foam), does not depend upon the rate of supply of the air and may be used for the system in question as a characteristic of its foam-forming capacity.

(2) the vertical component of the surface tension holding the bubble to the capillary

$$F_2 = 2\pi r\sigma \sin\alpha = 2\pi\sigma\frac{r^2}{R} \quad \ldots\ldots (4)$$

where r is the radius of the capillary, σ the surface tension at the liquid air boundary layer, α the angle described by the tangent to the surface of the bubble and the perpendicular to the axis of the capillary at the base of the bubble, and R the radius of the bubble.

Calculations show that under the conditions of our experiments F_2 is insignificant compared with F_1. Consequently there must exist in addition some force preventing the tearing away of the bubble from the capillary. The force of the viscose resistance of the fluid might be such. With the formation and growth of a bubble the layers adjacent to its surface have to be displaced relatively to each other. The movement of these layers exhibits all the greater resistance to the increase in volume of the bubble and to its pulling away the greater the viscosity of the liquid. In the general form this resistance may be expressed by the Newtonian equation

$$F_3 = \eta S\frac{du}{dz} \quad \ldots\ldots (5)$$

where η is the viscosity of the liquid, S the surface of contact of the bubble with the liquid, du/dz the gradient of the rate of movement of the layers of liquid. At the moment of pulling away of the bubble from the capillary the forces

$$F_1 = F_2 + F_3 \text{ or } V_1(D-d)g = 2\pi\sigma\frac{r^2}{R} + \eta S\frac{du}{dz} \quad \ldots\ldots (6)$$

It follows from this that the volume of the bubble at the moment of pulling it away from the capillary is equal to

$$V_1 = \frac{2\pi\sigma\frac{r^2}{R} + \eta S\frac{du}{dz}}{(D-d)g} \quad \ldots\ldots (7)$$

Substituting the value V_1 in equation (1), we get the following equation for the characteristic of the foam-forming capacity of the system:

$$Vt = V_1 nt = \frac{2\pi\sigma\frac{r^2}{R} + \eta S\frac{du}{dz}}{(D-d)g} nt \quad \ldots (8)$$

linking it with such properties of the foamed liquid as the surface tension and viscosity.

In investigating foam-formation in latex the value Vt was taken as a measurement of the foam-forming capacity. The foaming was carried out in the apparatus described with one and the same capillary and one and the same velocity of air, and the value Vt was calculated as the arithmetic mean of 5 to 10 experiments. The surface tension of the latex was measured by the method of the maximum pressure of a bubble, and the viscosity by the Höppler method.

TABLE 1

LIMITING VOLUMES OF FOAM OF BUTADIENE-STYRENE LATEX AND NEKAL SOLUTION

SKS-30 latex 30%			SKS-30 latex 25%			Nekal solution 3.25%		
Limiting volume, V, cu. cm.	Foaming time, t, sec.	Vt, cu. cm. sec.	Limiting volume, V, cu. cm.	Foaming time, t, sec.	Vt, cu. cm. sec.	Limiting volume, V, cu. cm.	Foaming time, t, sec.	Vt, cu. cm. sec.
64	18	1,150	12	18	216	84	30	2,520
60	25	1,500	13	16	208	83	29	2,400
42	24	1,010	11	16	176	78	29	2,260
45	26	1,170	15	11	165	76	34	2,580
43	31	1,330	13	11	143	68	31	2,100
40	44	1,760	18	9	162	64	31	1,980
25	43	1,070	26	8	208	61	36	2,200
25	50	1,250	23	7	161	60	43	2,580
23	55	1,260	23	8	184	48	56	2,680
Average.....		1,280	Average.....		180	Average.....		2,370

It is possible to demonstrate that the value Vt is determined by the physico-chemical properties of the foamed liquid. With air foaming of latices, it was observed that on increasing the rate of supply of the air there is an increase in the volume of a single bubble of foam, V_1.

Assuming that the limiting volume of foam

$$V = V_1 n$$

where n is the number of bubbles in the foam, taken as a constant for an approximation, we may write

$$Vt = V_1 nt = \text{constant} \quad \ldots\ldots (1)$$

or

$$V_1 t = \text{constant} \quad \ldots\ldots (2)$$

It follows from equation 2 that for a given system, an increase in the volume of an individual bubble is accompanied by a reduction in the time for which it exists, *i.e.*, its stability is reduced (this was observed qualitatively by experiment) and that for a given stability of bubble the greater its volume the higher will be the foam-forming capacity of the system.

The following forces act upon bubbles formed at the end of the capillary on the slow passage of air through the layer of foamed liquid:

(1) the lifting force of the bubble, striving to detach itself from the capillary

$$F_1 = V_1(D-d)g \quad \ldots\ldots (3)$$

where D is the density of the liquid, d the density of the air and g the acceleration of the force of gravity;

REFERENCES

[1] P. A. Rebinder, *Zh. RFKhO, ch. Fiz.*, 1926, **58,** 517; 'Fiziko-Khimiya Moyushchego Deistviya,' Sbornik Nauchn. Issled Trudov, Moscow and Leningrad, 1935; Bartsch, *Koll. Zeits.*, 1926, **38,** 177; D. T. Talmud and S. D. Sukhoval'skaya, *Zh. Fiz. Khim.*, 1931, **11,** 31; B. Tyutyunnikov and N. Kas'yanova, *Masloboino-Zhirovoe Delo*, 1930, **2,** 40.

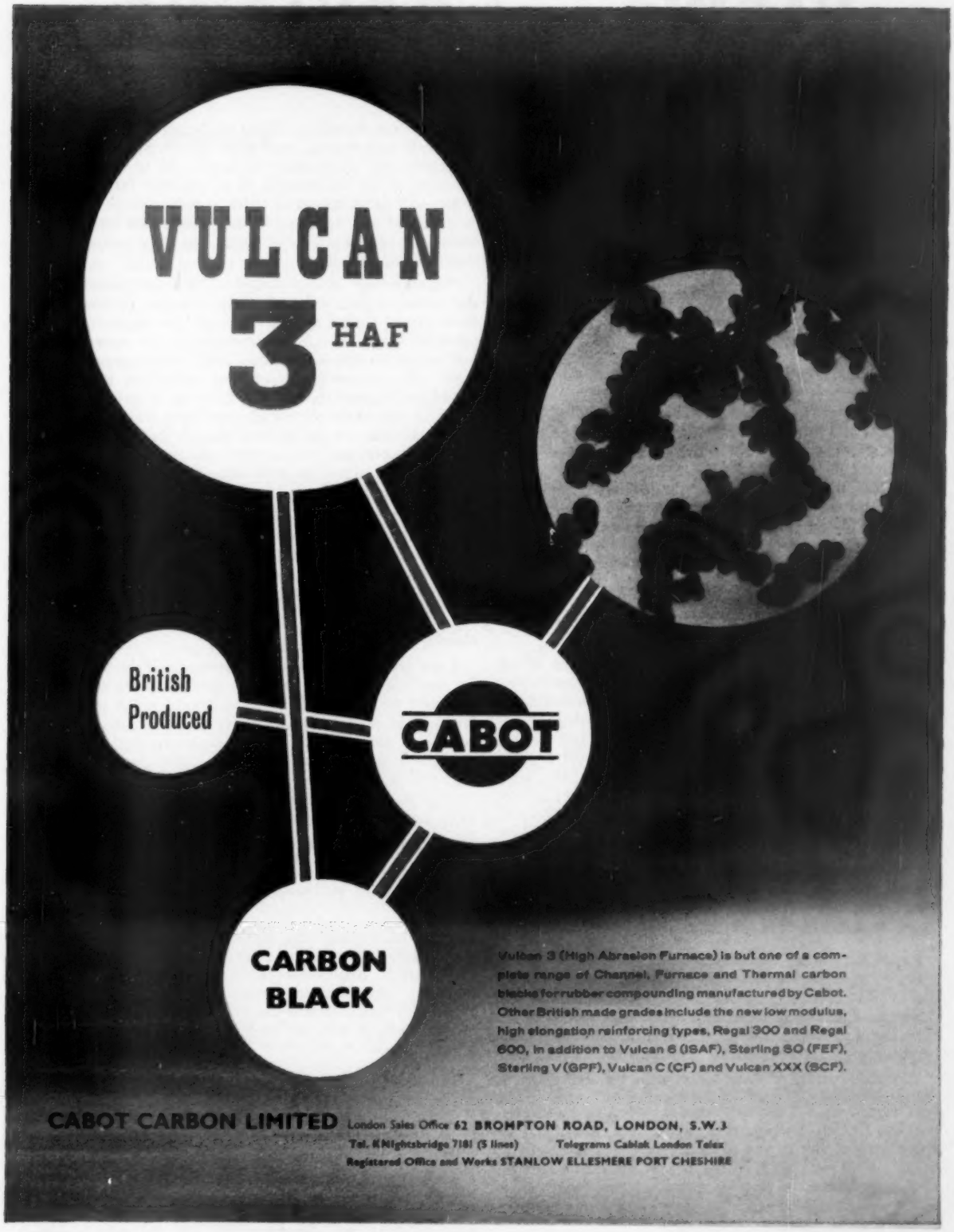
[2] A. V. Dumanskii, T. A. Granskaya and N. V. Novikov, *Tr. Tsentr. N.-I. Biokhim. Inst. Pishch. Prom.*, 1933, **3,** 361.

[3] K. N. Arbuzov and B. N. Grebenshchikov, *Zh. Fiz. Khim.*, 1937, **10,** 32; J. J. Bikerman, *Trans. Faraday Soc.*, 1938, **34,** 634; A. M. Rozenfel'd, 'Fiziko-Khimiya Sto'kikh Vozdushno-Mekanicheskikh Pen,' Primenyaemykh v Pozharotushenii, Moscow, 1941; E. M. Savitskaya and P. A. Rebinder, *Koll. Zh.*, 1951, **13,** 200; B. V. Deryagin and A. S. Titievskaya, *Ibid.*, 1953, **15,** 416.

[4] C. H. McFadden, *Ind. Rubb. World*, 1950, **121,** 419-23; E. C. Crocker, *Rubb. Age*, 1950, **67,** 305-11; L. Talalay and A. Talalay, *Ind. Eng. Chem.*, 1952, **44,** 791-5; R. Noble, *Latex in Industry*, 1953 No. 4; C. F. Flint, 'Natural Latex and its Applications,' London, 1954; E. A. Murphy, *Trans. Proc. Instn. Rubb. Ind.*, 1955, **31,** 90-114.

[5] A. J. de Vries, *Rec. trav. Chim. Pays-Bas*, 1957, **77,** 81, 209, 283.

(*To be concluded*)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VIEWS and REVIEWS

FORTY years ago, one of the most interesting substances used in the rubber industry was 'rubber substitute,' or 'sub' as it was called more for convenience than affection. Its feel and smell were unique and unforgettable but how such a fragile, brittle substance could be a substitute for tough, nervy rubber, seemed then a matter of special pleading.

An interesting review of the present production and commercial position of factice in Europe is given by M. Biron in *Revue Generale du Caoutchouc*, vol. 37, No. 6, June 1960, pp. 791-801. Side by side with the original French is a very clear translation by Dr C. F. Flint.

Ten Types of Factice

The factices are reaction products of either sulphur or sulphur chloride (giving brown or white factice, respectively) with oils, chiefly colza, linseed, or castor; some have additional mineral oil or bitumen. Altogether the author distinguishes ten types of factice made in Europe. When the factices are cheaper than rubber they can be used to reduce the cost of such rubber compounds in which a small sacrifice of physical properties is permissible but, because they improve some of the processing characteristics of rubber compounds, the factices are used to some extent even when they are dearer than rubber. As Dr Flint's translation says:

'Their principal properties are a plasticizing effect which facilitates the preparation of stocks, calendering, and extrusion, and reduces the power consumption. Further they prevent the collapse of extruded stocks during storage and during vulcanization. They reduce the hardness of vulcanizates, and they improve slightly the resistance to ageing. Like rubber, they are good dielectrics. On the other hand, their use brings certain disadvantages such as a reduction of the mechanical properties, notably the abrasion resistance, and an increase in the elasticity. Further, sulphur factices are generally dark brown, which limits their use to dark-coloured vulcanizates and the white factices may, when used under severe conditions, liberate chlorine — which causes them to be excluded specifically from certain specifications.'

Two Schools

These remarks add point to a recent discussion on the meaning of the word 'filler.' There are two broad schools of thought: those who would define a filler as a diluent or cheapener, something which adds to the bulk without doing anything else, except reduce the cost, and those who regard as a filler any powder added in large proportions for any purpose to a rubber mix, and therefore speak without any feeling of incongruity of a 'reinforcing filler.' If anyone, such as the British Standards Institution, ever makes a pronouncement on the point, it is likely to be based on terminological usage in the industry rather than on pedantic etymology.

It is well to recognize that there is probably no substance which, added in quantity to a rubber mix, will not have some observable effects on the physical properties, be it only a stiffening, and often the tensile or abrasion properties are significantly reduced. It is one of the functions of the technologist to decide how far the properties can be sacrificed in order to reduce costs. It will be conceded too that compounding ingredients introduced initially to cheapen the compound are often retained for their specific effects.

You can buy gin at something less per bottle than the standard price but its alcohol content is down. I have never worked it out (because the figures are in 'degrees proof' which is something to do with setting fire to gunpowder — and why should I buy gunpowder?) but I will guess that it is cheaper to buy the stuff with the higher alcohol content and fill it up from the tap at home, if that is the sort of gin you want. There may be analogous cases in rubber and plastics technology but I know of only one where you can merely dilute the properties by adding an inert diluent (whip more air into latex foam): all others I can think of now have other effects like diluting gin with soda water or bitter lemon.

If, indeed, by adding, say, 10% of a filler, there is no loss of properties, or even if the loss of properties is less than 10%, then the filler is more than a mere diluent — it is a reinforcer.

Careful Balance Sheet Necessary

I am trying to argue that it seems unlikely that there are any 'fillers,' within the strict meaning of the definition proposed by School of Thought No. 1, which added in fairly large proportions will have no effect on the properties. I am not, of course, trying to say that there are no such things as cheapeners. Of course there are. But each one needs testing in a range of proportions in its appropriate compound and process, and a careful balance sheet prepared of all the costs set against the effects on the properties, in order to find the optimum proportion. I have known '100% rubber' compounds which work out cheaper than those containing large proportions of fillers which degraded the properties more than they reduced the cost.

When all this has been said — and I may return to the theme soon because it is a basic problem in the rubber and plastics industries — factice remains a useful compounding ingredient in certain circumstances, as much as in 1870 when it first came into popular use, though, on the synthetic horizon, there is a 'cloud no bigger than a man's hand.'

M. Biron's article points out that: 'Factices are not used in all compounds: their use in tyres has completely ceased; on the other hand, they are still indispensable in other manufactures such as erasers.'

Had he left his remarks there he might have been exposed to derisive laughter, but he goes on to list in a table the principal types of rubber articles in which the factices are used. These include shoe uppers, surgical goods, tubing, roll coverings, etc. In the roll-covering field, he says, the polyurethanes may take over because a wide range of hardnesses can be made with them.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

Factices for Synthetics

The synthetic rubbers often demand special factices. 'Neoprene, which possesses the advantage of not swelling and not being combustible, requires the use of factices possessing the same properties. In the case of the thiokols, it is advised to use 10-20% of factices in order to facilitate extrusion or to reduce hardness. Ordinary factices can be employed in SBR rubbers, but some firms have nevertheless developed new types of factices. For the nitrile rubbers, Goodyear and Hycar Chemical Co. advise the use of factices in order to facilitate extrusion. In butyl rubbers, the use of chemically unsaturated materials gives unsatisfactory results, so the use of factices with these rubbers is not advised.'

Studying the trend of factice production in France in relation to its price, the author concludes that at the present time the use of factice as an extender for rubber is of little importance. This may not be as true in other countries because there are influences peculiar to France which raise the price of factices there. The tenor of his overall conclusions is a pessimistic one from the point of view of factice and it is especially interesting to quote his section entitled 'Competitive Products'.

Benefits of Cross-Linking

'Factices are used to correct certain defects in natural and synthetic rubbers. In order to mitigate these difficulties, the rubber manufacturers have in the case of the butadiene-styrene copolymers developed special qualities, terpolymers: butadiene-styrene divinylbenzene. The divinylbenzene, introduced in small quantities gives a small degree of cross-linking which produces the following effects: low recovery, better dimensional stability, improved calendering and extruding.

'These special varieties of rubber are not generally used alone but in admixture with the standard tyres of SBR or with other rubbers. That use is therefore, from every point of view, comparable with that of factices, and it similarly brings about a slight diminution of physical properties.

'The idea on which this work is based — the production of a raw polymer, partially cross-linked — has been taken up by the Rubber Research Institute of Malaya and applied to natural rubber. The product sold under the name of SP rubber (Superior Processing Rubber) is obtained by coagulating, followed by sheeting, a mixture of four parts of ordinary, fresh latex with one part of vulcanized latex.

'The advantages of SP rubber are: the possibility of obtaining good surface appearance, good dimensional stability, and low recovery, while having the same physical properties as ordinary rubber. SP rubber can be used as the only elastomer (an absolutely different use from that of factice) or as a secondary elastomer (a use comparable with that of factice).'

This paints a dismal picture of the future for the factices especially as no new outlets for them are apparent.

Water-Emulsions

The same issue of *Revue Generale* carries a trade article on 'Struktol,' another processing aid for rubbers. It was around 1920 that Temme discovered that water was a good plasticizer for rubber and improved the dispersion of compounding ingredients. In order to enhance the effect and to avoid the inconveniences and difficulties of direct incorporation of water into rubber he had recourse to the use of water-emulsions of oils, thus providing a kind of intermediary between the hydrophobic rubber and the more-or-less hydrophilic fillers.

The 'Struktols' are such emulsions, consisting basically of fatty acids and their esters, partly sulphonated and partly having additional emulsifiers, any residual free acid being neutralized. For convenience and cleanliness in use, a precipitated calcium silicate is employed as a vehicle.

The cable industry has been taken as a special test of the efficacy of 'Struktol,' the paper considering its effects during mixing on rolls or in internal mixers, calendering, extruding, curing in autoclaves, continuously and in lead, in moulding, and finishing operations. In mixing, 'Struktol' brings about a cooling which reduces power consumption and cooling water used, and eliminates sticking to rolls or to the chamber of internal mixers. The lower temperature also permits the use of more active accelerators without danger of scorching. 'Struktol' reduces extruding time while giving a smooth surface.

These are among the processing advantages to be expected from a material of this composition, and indeed a longer list of claims is made, but the main object of the paper is to show that although part of the plasticizing effect is caused by the water in the 'Struktol' — although the proportion is said to be only 4% — it has no influence on the subsequent electrical properties of the vulcanized compound.

By the use of 'Struktol,' it is claimed, scorched mixes can often be recovered. An example is given of a compound for handlebar grips, vulcanizing in one minute at high temperatures, which had set up but was recovered by means of 'Struktol' and at once moulded and cured at the same time and temperature as a normal compound.

CHARLES JENNINGS

Universal Conduit Boxes

In an effort to normalize the junction facilities of buried conduits, a Danish firm has developed a 'porcupine' type of conduit box featuring multi-spout outlets, which is described in a technical digest issued by the European Productivity Agency.

An interesting feature of the new boxes is their all-nylon construction which assures efficient electrical isolation against electrolytic action, by breaking the installation into separate sections.

Non-used spouts are plugged with waterproof plastic blanks. Steel or plastic pipes are equally adaptable to the boxes.

In addition to their corrosion resistance, the boxes offer the advantage of easy installation. Tapered plastic retainer sleeves forced over the spouts and pipes assures a strong water-tight joint, without the need for extra sealing or clamping provisions.

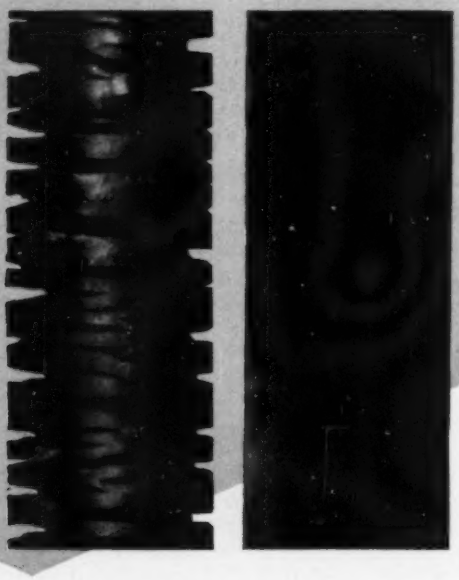
how to vastly increase the useful life of rubber...

Effect of Curing System on Antiozonant Retention in SBR Stocks after Vulcanization

(All contain 3.0 phr UOP 88; 40.0 phr HAF black)

Compound	Accelerator	Sulfur, phr	% Extractable Antiozonant
1082....	2.0 phr benzothiazyl disulfide	2.0	66.4
1085....	1.0 phr benzothiazyl disulfide	2.0	79.6
1087....	None	2.0	~100.0
1088....	1.0 phr benzothiazyl disulfide	3.0	74.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.5
1089....	1.0 phr benzothiazyl disulfide	1.0	83.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.5
1084....	1.0 phr N-cyclohexyl-2-benzothiazole sulfenamide	—	—
1093....	1.0 phr diphenylguanidine	2.0	~18.0
1085....	2.0 phr tetramethylthiuram disulfide	—	35.0
1090....	4.0 phr tetramethylthiuram disulfide	—	12.9

The SBR specimens below were exposed to ozone at 100°F with 20 percent elongation for 52 hr. at 33 pphm ozone, then 187 hr. at 63 pphm ozone.



Carbon black—HAF (high abrasion furnace), Curing system—4 phr tetramethylthiuram disulfide; Hours to first crack—7 to 23.

Carbon black—HAF (high abrasion furnace), Curing system—2 phr sulfur, 1 phr N-cyclohexyl-2-benzothiazole sulfenamide. No cracks in 239 hr.

CONSIDER THE EFFECT OF YOUR CURING SYSTEM ON THE EFFECTIVENESS OF A CHEMICAL ANTIOZONANT

In compounding rubber, there are several things which are important in assuring maximum crack-free life. First, you must use a potent antiozonant like UOP 88 or 288. Next, consider what a vast difference in effectiveness can be realized by your *curing system.*

The right antiozonant used in correct proportion is of primary importance. Then, by using the proper accelerator, you can promote its maximum effectiveness, and thus contribute to maximum ozone protection.

Look at the two rubber test strips illustrated. Both were formulated with UOP 88 . . . but note how much more effectively the antiozonant worked when accompanied by this change in curing systems—a vast increase in resistance to cracking. The table above the test strips shows how the *proper* accelerator aids antiozonant effectiveness.

Help in achieving maximum effectiveness from UOP 88 or 288 antiozonants in your rubber formulations is available through UOP facilities and technical personnel. Just write or telephone our Products Department.

WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW

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NEWS ABOUT MACROPLASTIC

●Buhler Brothers, a Swiss firm, will exhibit the Rover 175 and 350 fully automatic injection moulding machines. The larger of these machines has a shot capacity up to 61cu./in. and a plasticizing capacity of 150lb./hr.

●A fast preplasticizing moulding machine built by Cravens Ltd. of Sheffield, to the HPM design, will be shown on the stand of their agents, Lindeteves-Jacoberg N.V. This will be the 350-P-28 model, a 28oz. machine with a 34in. daylight and 22in. stroke.

●The products of Revertex Ltd. are to be exhibited on the stand of Heybroek and Co.'s Handel Maatschappij N.V. These include Emultex polyvinyl acetate, Revertex natural latices and rubber compounds and Aquaplas anti-drumming compounds for transport applications. Also on the same stand will be Baryfol sound insulation mats made by Dr Stankiewicz GmbH, Hannover.

●Among the variety of products of Chemische Werke Hüls are fish baskets of Vestolen A, big containers of rigid Vestolen, open and closed cell PVC foam and a range of polyester mouldings including chairs and helmets.

●Plasticonam Amsterdam N.V. produce vacuum formed, injection and blow moulded and welded plastic articles and specialize in the manufacture of packaging materials, and these will be features of their stand at the MacroPlastic exhibition.

●A range of drying ovens from a small model for drying PVC granules for gramophone records to a large 1,100lb. unit manufactured by Wilh. F. Hoffman and Co., Copenhagen, will be on the stand of their Dutch agents Wilmod Compagnie N.V.

1961 US Plastics Show Growing

Overwhelming demand for exhibit space at the New York Ninth National Plastics Exposition, June 5-9 1961, has necessitated that the Society of the Plastics Industry open the third floor of the New York Coliseum to participating exhibitors.

224 plastics companies have now been assigned exhibit space, promising to make the 1961 show the largest ever held in the USA. Advanced registration represents an increase of 56 participants over the last plastics exposition held in Chicago in 1958.

Every aspect of the plastics industry will be represented including moulders, laminators, extruders, fabricators, manufacturers of reinforced plastics products, plastic film producers, tool, die and mould makers, raw materials suppliers, machinery and equipment manufacturers.

Werkspoor NV, of Amsterdam, will show a wide variety of reinforced plastics products at the Utrecht exhibition. This dome, in glass-fibre reinforced polyester, was manufactured and erected by the firm for Leiden Observatory

A. W. WALLICH

Mr Aubrey Woodford Wallich, O.B.E., M.C., who died in London on September 6, aged 62, was a well-known figure in the plantation rubber industry. During 1957-1958, he was chairman of the Rubber Growers' Association, of which he had been a council member since 1953.

In 1920, he joined Boustead and Company, becoming a director on the Eastern Board in 1941 and of the London company in 1950. He retired from service with Bousteads in 1957. He was a director of a number of rubber companies including Taiping Rubber Plantations Ltd., Lower Perak Rubber Estates Ltd., and of Envoy Recording Co. Ltd.

In 1916, Mr Wallich obtained a regular commission in the Royal Field Artillery, serving in France and Belgium. During World War II, he became a pilot in the Malayan Auxiliary Air Force; served with the RA in North Africa, and was for two years Civil Affairs Officer, Supply, Malaya. He was a member of the Legislative and Executive Councils, Federation of Malaya, during 1947-1949. Born in Taiping, Malaya, he was educated privately and at Malvern.

MANSA Convention

The Man-Made Soling Association (MANSA) will hold its 1960 convention at the Café Royal from October 4-6. Speakers will include C. B. Lupton (advertising and marketing manager, Dunlop Footwear) on man-made soling and the retailer; W. G. Smith (general manager, Avon Footwear Sales) who will consider points from the consumer angle; and F. Baynes (manager technical developments, Dunlop Footwear) who will talk about the development of direct moulding of footwear.

Exhibitors at the convention will be: International Synthetic Rubber, I.C.I., Monsanto, Polymer (UK), Joseph Crosfield, Avon Footwear Sales, Dunlop Footwear, Goodyear, Rubberware, Sussex Rubber, Pirelli, C.I.C. Engineering. Their displays will collectively tell the story of the manufacture, development and use of all types of man-made soling materials.

F. J. Errol, M.P., Minister of State to the Board of Trade and Mrs Errol will open the convention.

Sam Kay and Co. Ltd., Elton Fold Mills, Bury, Lancs., will be closed for holidays from September 16–21.

But nothing to the hardness you get in rubber with Crosfield white fillers

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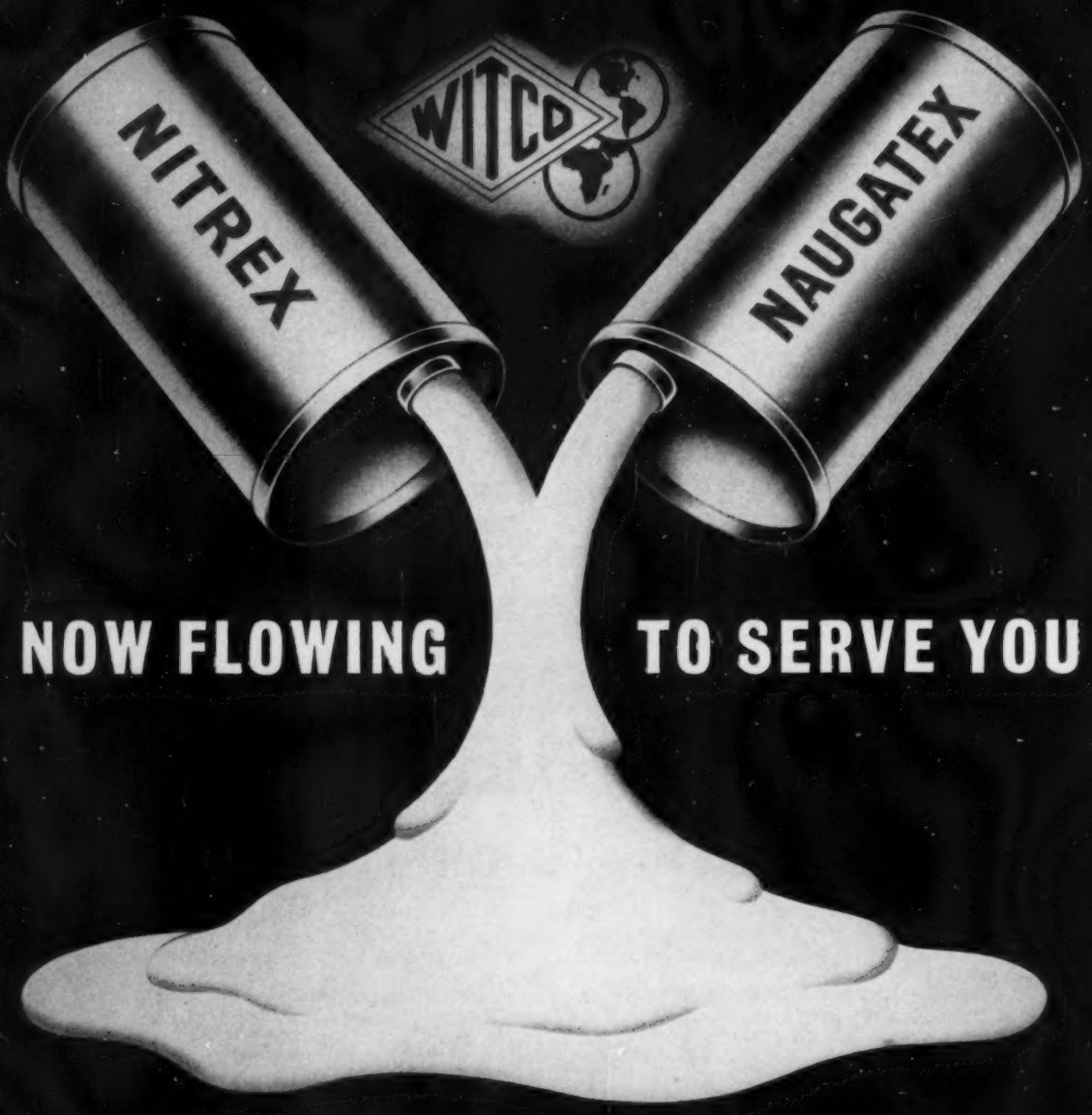

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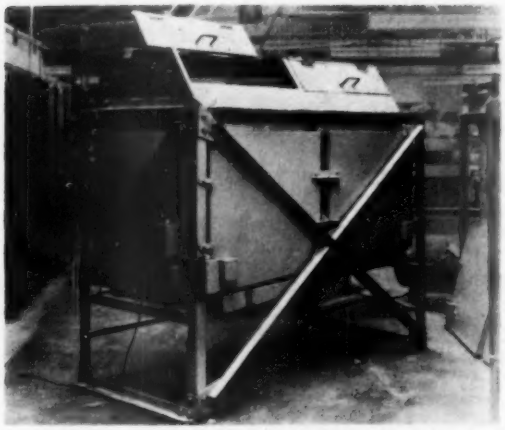
British Equipment for Russia

ISOMANTLES FOR RUSTYFA PROJECT

THE Rustyfa project provides for the design and supply of a factory for the production of tyres of all sizes from earth moving equipment to motorcars. This production unit will, according to reports, be the largest in the world and has been ordered by the Soviet Union from a consortium of British companies.

The various melting tanks, storage containers and pressure vessels have been engineered by Simon Handling Engineers Ltd., Stockport, those that require heating to exact temperatures have been supplied with Isomantles—electric surface heaters — by Isopad Ltd., Boreham Wood.

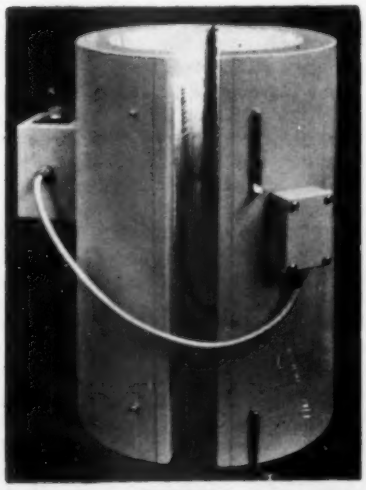


Melting tank heated by Isopanels with thermostatic controls using thermocouple instruments. The capillary leaving the vessel can be seen

The injection pressure vessels are heated by jackets comprising the heating surface, thermal lagging and outer sheet metal casing. Temperatures are regulated by automatic controls actuated by thermocouples. The thermostats are arranged so that they give audible warning of a drop in temperature below the required level. Some of these vessels will be used with alternative contents and these are fitted with dual systems one for temperatures from 60° to 100°C. and the other for the 100/300°C. range. Also used on some tanks are flat panels similarly operated and controlled.

To keep the interconnecting pipework at the required temperature, isotapes have been used. These are flexible tapes with an electric element embedded in silicone rubber enclosed in a woven glasscloth covering, using the same type of thermostat fitted to special pipe clamps for mounting on location.

Special weighing equipment was also supplied for the project on which isojackets are used to keep the ingredients at the right temperature during the weighing operations. These special jackets leave ½in. clearance between the heating surface and the vessel so that they remain still while the container is free to move up and down. Operation is in this instance purely by radiation and convection.



Isojacket heating jacket for injection pressure vessel. This is made in two hinged halves for easy fitting. The bulb of the liquid expansion thermostat is fitted to the heating surface

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F. J. Edwards Ltd., 359 Euston Road, N.W.1, have changed their London telephone number to EUSton 5000.

Extruded Fire Hose

FORMICA DEVELOPMENT

AN extruded fire hose said to be of exceptional lightness and flexibility yet tougher than many of the traditional types in use, has been produced by Formica Ltd. Of interest is the extrusion process which forces flexible PVC around and through a Terylene sleeve. One homogeneous material is the result, which meets and in some cases surpasses the British Home Office Specification.

Besides the tolerance of very high pressures and other known properties of the combined material, the new hose has the useful quality of excellent visibility at night because the brilliant yellow colour never fades.

Already shown and demonstrated at the British Fire Services Conference/Tournament at Bognor Regis this year, Formica fire hose has more than proved itself. Firemen are especially pleased that it does not graze or break the skin of their hands when it is run out at speed. Supplied in standard lengths of 75ft., the hose is offered initially in two sizes, 2½in. and 2¾in. bore and is economically priced at 5s. and 5s. 6d. per foot respectively.

Packing and Quality

The six overlapping RMS and Singapore grades provided one of the main points of interest when the International Rubber Packing and Quality Conference opened in Singapore on September 12.

Also on the agenda were recommendations for the adoption of types of rubber not now listed in the 'Green Book' (which classifies most types and packing specifications used in international trade), and consideration of recommendations for amending type descriptions, packing specifications and glossary of terms of the 'Green Book.'

Delegates from 12 countries are attending the conference which is scheduled to end today. The 12 are: the UK, USA, Ceylon, Australia, the Netherlands, West Germany, Italy, Japan, Cambodia, France, Israel and Indonesia. Singapore and Malaya are also attending.

Certificates representing 20 and 50 shares of 1,000 lire nominal each in the Montecatini mining and chemical concern of Milan will be introduced on the Amsterdam Bourse by five leading Dutch banks on September 16. Official listing has been applied for.

EXHIBITION PREVIEWS

1960 Commercial Motor Show

NEW TYRES TAKE THE ROAD

ALTHOUGH the motor industry is using more and more plastic and rubber components — glass reinforced polyester bodywork — vinyl upholstery covers — urethane foam cushioning — ABS resin interior panelling — to mention but a few, the whole industry is based literally on rubber tyres. With the development of the motorways in this country the safety of the car driver depends more than ever on the quality of his tyres and special grades for sustained high-speed motoring are available in this country from all the manufacturers. These and other special tyres are appearing in restricted ranges but additions to these are continually being made and there will be some new sizes exhibited at the motor show.

On the Michelin stand will be two of the latest X tyres in 8.25-17 and 7.00-16 sizes and also featured will be a tyre renewed by the Michelin Rebuildex process.

New additions to the Romac range to be introduced are tyre vulcanizers, in two sizes for passenger and commercial tyres, and a range of nylon vulcanizing plasters. Other Romac products include air compressors, a small sand blast cabinet tyre buffing equipment and the 'cure-c-cure' repair process.

Stenor Ltd., one of the Firth Cleveland groups of companies are displaying a wide range of tyre repair accessories, workshop machinery, hand and power tools and vulcanizers, including a new dual purpose vulcanizer suitable for all tube, and car and commercial valve repairs. The machine can also be used for the repair of fire hoses.

Among the Dunlop exhibits will be two new dual purpose tyres known as RK8 and RK9. It is planned that these will eventually replace, in a limited range of popular sizes, the Roadtrak Major, one of Dunlop's most successful tyres. The RK8 has a very deep pattern and thick tread, the design provides good grip on loose surfaces but is sufficiently stable to give good mileage and traction on firmer roads. The RK9 is intended to complement the RK8 and the combination of RK8 on the rear wheels and RK9 on the front should be ideal for heavier vehicles. In addition to these new tyres the normal Dunlop range will be on view including solid tyres for commercial vehicles which are made from Duthane. This is a synthetic material based on polyurethane used for these tyres because of its strength, hardwearing properties and resistance to oil and grease. A wide selection of tyre service equipment will be shown, Dunlop rubber wings and accessories and examples of Dunlopillo seating, and on the Dunlop Rim and Wheel Company stand will be brakes and the Pneuride suspension unit.

For cars capable of maintaining speeds in the 100mph plus range Goodyear have developed the motorway Special which is a silent running, 4-ply nylon tyre with very high strength and resilience. Other Goodyear tyres on show are the All Weather with the self adjusting tread which is one of their most popular tyres, the Ultra Grip designed for winter conditions, and another new line, the Marathon which, at 15% below the price of the standard all-weather tyre, is intended for the owners of pre-war and just post-war cars (assuming that they pass the test). The full range of Goodyear accessories will also be shown and these include fan belts, radiator hose and repair kits.

Polyurethanes in the Factory

EQUIPMENT EXHIBITION AT BELLE VUE

CHEMICALS for polyurethane foams will be featured by I.C.I. Dyestuffs Division at the International Factory Equipment Exhibition, which opens at Belle Vue, Manchester, on September 21. Flexible foams are being increasingly used for safety padding, upholstery, packaging, insulation, floor covering, bumper pads and shock absorbers, while rigid foams are in demand for lightweight building components, insulation in refrigerated stores and roofs of buildings.

Both the polymer reactants and the isocyanate components are being made in Dyestuffs Division's Huddersfield plant. The isocyanate components are shortly to be produced also at the Division's new plant at Fleetwood.

There will be more than 200 exhibitors at Belle Vue, covering 11 fields: building and insulation; heating, power, ventilation, air-conditioning, dust and fume extraction; handling, packing, partitioning and storage; business machines and drawing office equipment; workshop machines and tools; general industrial equipment; instruments and electronic devices; product finishing and anti-corrosive treatments; safety, canteen and welfare; protective clothing; cleaning and maintenance.

I.C.I. Fibres division will have a full stand, showing Terylene V-belts, filter cloths, tarpaulins and conveyor belts — including the new J. H. Fenner SpacesaVer wedge-belt drive, on public display for the first time.

Examples of laminated chemical plant, industrial hose, and fire hose will be shown. A 'Terylene' overlaid glass fibre reinforced pipe bend and a 100% 'Terylene' tank will illustrate the growing use for the material in this field.

Also exhibited will be examples of 'Terylene' protective clothing: ropes, slings, webbing, and safety harness; 'Terylene' valve diaphragms, ventilation ducting, fuel and water tanks, inflatable buildings, battery fabrics, cargo and safety nets, and sewing thread.

Methods of using electricity for heating factories, workshops, stores and similar premises will be featured on the stand of the Electrical Development Association.

Three main methods will be represented: floor warming, block storage heating, and infra red heating.

Block storage heaters consist of an assembly of blocks of concrete incorporating electric heating wires, the whole being enclosed in a sheet metal case. Infra-red heaters can be installed either on the walls or ceilings of factories and workshops at a suitable height, and represent a great saving in running costs because they may be used singly, in groups, or all at once, depending upon whether a small or large area is to be heated.

Other exhibitors include Gordon and Gotch (Sellotape) Ltd.; Halex Ltd.; Ronald Trist Ltd., and Vulcascot Ltd.

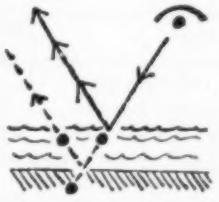
The exhibition will run until October 1.

Electrical Aids in Industry *Data Sheet* **No. 13**

Infra-Red Heating

Infra-red heating is the name given to the method of using in industrial processes radiant heat from heaters specifically designed for that purpose. This differentiates it from methods employing both radiation and convection, as in furnaces, although the effect of the radiation is much the same in both cases.

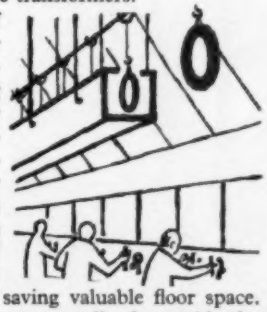
Radiant heat provides a higher rate of heat transfer to bodies not highly reflective than does convection, unless high-velocity forced convection is used. The rate of heating of a body depends upon the intensity of radiation on its surface, the proportion absorbed by the surface and, subsequently, on heat conduction. In heating very thin bodies, for example paint films, the radiation not reflected nor absorbed passes through and is in turn reflected or absorbed by the underlying material. This reflected heat is partly absorbed by the paint film "on the way back". Despite this effect it is an exaggeration to claim that infra-red "heats from the inside out" and it remains largely a surface heating effect except in a few special cases.



Infra-red heaters mainly use metal-sheathed elements in special reflectors, but infra-red lamps with internal reflectors are still used in special cases. Other types use silica-sheathed elements or quartz-sheathed lamps in reflectors. A wide range of heaters is available with simple mounting arrangements to enable heat to be applied quickly and effectively either in a production line or in some odd corner.

Control of the charge temperature is effected by regulating the heating time and power. In the case of a moving charge, this is done by adjusting the conveyor speed and the number of heaters in circuit, i.e., by adjusting the effective length of the oven. Some of the heaters may be controlled by energy regulators or adjustable transformers.

The advantages of infra-red heating over convection heating include reduced heating times, reduced floor space, lower installation costs, almost instant starting, ability to focus the heat, and flexibility in effective oven length. Infra-red ovens can often be mounted in the roof, saving valuable floor space. Infra-red heating is not generally favourable for heating large bodies of low heat conductivity.



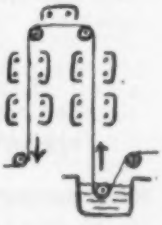
Paint Stoving

Not all paints are suited to infra-red radiation, but suitable paints are stoved quickly and often give a better finish. Synthetic enamels are the most suitable. Articles successfully stoved include motor car bodies, wheels and other accessories, refrigerator and washing machine cabinets, cylindrical drums and barrels, metal furniture, valve hand wheels, metal toys and a host of other articles. Lacquers and varnishes are being quickly and effectively stoved on jewellery, packing strips, tubes, films and similar products. Special infra-red lamp ovens stove synthetic finishes on wooden furniture and components. In all cases stoving times have been reduced very considerably.

Moisture Extraction

Sheathed element heaters are particularly useful for drying surface water films, their radiation being readily absorbed by water. High rates of drying are possible provided the water vapour can readily disperse. Drying of "contained" water can be effected provided the water can diffuse from the interior at a rate equalling the surface drying rate. With heat-sensitive materials sheathed element heaters may have to be arranged to move away from the material to avoid overheating if the conveyor stops, being interlocked with the conveyor for this purpose. Lamps are sometimes used instead for such materials because of their instantaneous cut-off.

Infra-red is widely used for drying coatings and inks on paper and textile products, bottle seals and labels, clayware and glazes, pigments on leather and many other products.



Plastic Heating

Infra-red heating is widely used in the plastics and allied industries. Typical applications are the preheating of plastic pellets and of sheets prior to moulding, curing of plastic and rubber sheets and belts, heat setting of nylon and similar fabrics, drying and curing of latex films on carpets and many others where a plastic forms the whole or part of the product.

The above are just a few examples of successful applications of infra-red. In many other processes infra-red heaters can often be fitted quickly and cheaply, to save time, labour and floor space and, therefore, money.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London W.C.2. Telephone: TEMple Bar 9434.

Excellent reference books on electricity and productivity (8/6 each, or 9/- post free) are available — "Resistance Heating" is an example; "Induction and Dielectric Heating" is another.

E.D.A. also have available on free loan in the United Kingdom a series of films on the industrial uses of electricity. Ask for a catalogue.

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MEN and MATTERS

A Review of People and Events

by Peter Richards

THE luckiest man alive in the plastics business today is John Webb, 31-year-old director of Kay Brothers Plastics Ltd., of Marple, Cheshire.

He was thrown from a Jaguar travelling at 110 mph along the M1, escaped with no fractures and, although he was away for seven weeks, he is now back at his desk 100% fit. So fit, in fact, that he plans to turn out again this season as front row forward for his rugby club.

Mr Webb was travelling to London for a conference at the headquarters of Reckitt and Colman Ltd., the group which includes Kay Brothers, who supply plastics foam to major furniture and car manufacturers.

Just short of Luton ('actually in sight of the hospital,' he says), the car in which he was being driven burst a rear tyre and he was thrown from the front passenger door. He received bad cuts and bruises and a severe burn on one shoulder, caused by the exhaust of the careering Jaguar. But he showed real rugby forward powers of recovery by getting out of hospital in a fortnight. Now his return to full health and his work is being particularly welcomed at Kays, since September marks the beginning of the busiest time in the upholstery business.

Volunteers Step Forward

A new personnel category has been created at the B. F. Goodrich Research Centre at Bracksville, Ohio: that of research fellow. A research fellow, the idea is, can do what he likes. He can set his own pattern of research and follow it through.

The first two fellows have been named. They are Dr David Craig and Dr Forest W. Shaver. Dr Craig has been with Goodrich since 1928 and is editor of *Rubber Chemistry and Technology* published by the American Chemical Society. Dr Shaver is a specialist in peroxides, rubber accelerators, antioxidants and beta-propriolactone chemistry.

The research fellow will not have complete freedom. Goodrich says that a fellow is 'free to explore fundamental research projects of his choice which are in line with the research and development policy of the company.' A turn of phrase which is faintly reminiscent of the age-old army technique of asking for three volunteers.

Top Training

John Boardman, deputy-chairman of Burtonwood Engineering Co., has just returned from a month at school in USA. He took part in an intensive course of business management in New York at the American Management Association.

'This method of bringing together representatives of widely different industries and having them study work in groups is of tremendous value and could well be more widely emulated in the UK,' said Mr Boardman. 'During my course I was able to meet and exchange views with some 400 top level executives from all over the United States. At times working together in our study groups we tackled problems side by side with competitors. The course is invaluable not only in helping to equip executives with efficient tools but in giving members the chance to observe practical businessmen in action, tackling problems — an insight which we should never gain in the outside world of competitive business.'

Native Resistance

Mr Boardman said that he thought the course could teach much to management in the UK. With our native resistance to change, the idea that business management is something that can be learnt has certainly developed a lot more slowly in this country. But we are not so far behind as Mr Boardman seems to indicate.

Most of our larger concerns have grown to accept the concept of executive training, and the companies that provide this training have developed rapidly over the last decade. The Urwick Management Centre at Slough, for example, which is conducted by Urwick Orr and Partners in conjunction with their practice as management consultants, was established as long ago as 1948. Since that year it has been providing training courses at executive level in management subjects and has carried out research and development in new management techniques and practices.

The British Olympic Canoe team returned from Rome without an award—but polythene film got a medal for protecting the canoes during the overland journey across Europe. Visqueen polythene layflat 0.005in. thick was used

The ideas do not need importing so much as disseminating.

Nylon Garage

Cars are multiplying at a much greater rate than garages. Going through some parts of London is like driving through a perpetual car park. For the garageless motorist who has a plot of land but cannot erect a permanent building a motoring correspondent has suggested an inflatable hut.

Brian Goodyear has left Goodyear Tyre and Rubber (UK) and joined Shell Chemical as a press relations executive. He was on the *Northern Echo* from 1950-1958

One type manufactured by Cory Bros. of Great Tower Street, E.C.2, as survival equipment for explorers, makes an excellent portable garage. The neoprene proofed nylon skin is held up by air tubes which can be inflated by an electric blower attached to the car battery in about six minutes. A small size hut has an inside space of 12ft. by 10ft. and a height of 6½ft. Cost: £137 10s.

And for any motorist who does decide to buy one there is always the thought that if the winter is anything like the summer the equipment can be used for its original purpose.

Self-Lubricating Time

You could buy a man's ultra-slim watch (2.3mm. thick) for £579 at the Watch and Jewellery Trade Fair which closed yesterday. At the other end of the price scale was an electric alarm clock retailing for a mere 35 bob. This interested me because it was self-lubricating, having a nylon mechanism. It is made by Smiths who predict a very long life for the clock.

Unfortunately the mortality rate of alarm clocks in my household is not determined by the mechanism so much as by the half-dazed, early-morning hand that lets it slip or (sometimes) throws it to the floor.

Dunlop Director in Canada

Mr David B. Collett, a member of the Board of the Dunlop Rubber Company, has left London by air for Toronto to join a party from the Liverpool Chamber of Commerce. The visit, at the invitation of the Toronto Board of Trade, is the result of efforts inaugurated by the Chamber of Commerce following the opening of the St. Lawrence Seaway last year to develop closer business relationships between the two areas.

After the official business, scheduled to end on September 16, Mr Collett will visit Dunlop's Canadian factories at Toronto and Whitby, and the Dunlop Tire and Rubber Corporation at Buffalo, New York.

Relaxing Between Papers

The final address at the Natural Rubber Research Conference at Kuala Lumpur will be given by Sir Geoffrey Clay, Controller of rubber research. During one of the relaxation periods between papers visits will be made to rubber estates, a rubber remilling factory and to latex installations at Petaling and Port Swettenham.

* * *

Mr J. L. Mumby has been appointed financial director and secretary of the Goodyear Tyre and Rubber Company (Great Britain). He succeeds Mr W. R. Booth who has returned to the US as an assistant treasurer to the parent company, Goodyear Tire and Rubber Company, in Akron, Ohio, and treasurer of its subsidiary, Goodyear International Corporation.

Blue Peter Retreads have acquired the registered trade mark 'Red Seal' from Repetition Tyre & Accessories Ltd., and have taken over the manufacture and marketing of 'Red Seal' retreads. W. H. Stevenson, for many years a director of Repetition Tyre has joined Blue Peter Retreads as general sales manager of their 'Red Seal' activities

Question Corner — 135

(Second Series)

460. What are the advantages of blown polythene film over flat film?

(Answer next week)

Answer to Question Corner — 134

459. When polythene is heated above about 70°C. its crystallinity gradually declines and gives way to an increasing percentage of amorphous volume. When the temperature results in the resin losing the whole of the crystalline structure and it becomes entirely amorphous, it has reached its melting point and it changes from a solid to a highly viscous liquid.

The melting point of polythene is low, not much above 100°C. and far below the temperature at which the melt index is determined. High density polythenes have a higher melting point than low density resins and a high melting point results in decreasing cycle time for injection moulding, and increased production rates for blown film.

The heat softening point is the temperature at which a finished polythene article becomes too soft to withstand stresses and keep its shape. It is sometimes called Vicat Softening Temperature, that is, the temperature at which a flat-ended needle of 1mm.² cross-section, under a load of 1kg., penetrates 1mm. into a test piece.

An increase in the heat softening temperature will obviously produce an article which will endure higher temperatures without distortion. The heat softening temperature rises considerably with increasing density, and slightly with decreasing melt index.

(Another question next week)

Polly Ester Says . . .

'Mica — didn't pass the ten year test'

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BAKER PERKINS, of Peterborough, who have for many years supplied mixing and materials handling equipment to the rubber industry, announce an agreement with the German firms of Herbert and Troester, which allows the British firm to manufacture and sell a complete range of rubber processing and moulding machinery previously made in Germany.

HERBERT, of Frankfurt, are specialists in tyre-building and curing machinery and are the only designers outside the United States, of bladder-type tyre curing presses both for new and retread work. A recent important addition to their range is a new series of mechanically-operated presses for general moulding.

TROESTER, whose headquarters are at Hanover, supply standard rubber processing equipment — including mills, calenders and extruders. Their complete range has been redesigned recently to meet the present day trend towards higher output.

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Accidents in the Polymer Industry

RUBBER ABOVE AVERAGE: PLASTICS BELOW

THE rubber industry's accident rate is slightly above average. This is shown by 'accident incidence figures' which appear for the first time in the 1959 report of the Chief Inspector of Factories, published as a White Paper this week.

Incidence figures measure the number of accidents per 1,000 employees: for all industry the average rate was 19 accidents for every 1,000 people; rubber's figure was 20 a 1,000. Plastics moulders and fabricators, on the other hand, showed a much lower figure: 13 per 1,000.

Dangerous Handling

The report lists 1,864 accidents in the rubber industry in 1959, of which five were fatal. The biggest number of accidents — 520 or 28% — happened during the handling of goods. This is the category which, the report says, clearly offers most scope for improvement. Improved technical methods of moving goods other than by hand should bring improvements, it comments, but much could be done by a clear understanding of the dangers of faulty methods of handling.

Biggest culprit after handling was 'machinery in motion under power.' This accounted for 298 accidents — 16% of the total. In third place, causing 138 accidents (7%), was 'falls on the same level.' Falls of all description accounted for 249 accidents (13%).

605 accidents were reported last year by plastics moulders and fabricators. None of these were fatal. In the plastics raw materials field there were 489, one of which was fatal.

43% of the fabricators' accidents were caused by machinery under power — a figure twice as high as the average for all industry (19.2%). Handling goods came next — 221 accidents or 36%. This category was the cause of most of the accidents in the raw materials section (191 or 39%), while falls on the same level were responsible for 80 (16%).

Two-Roll Mills

The rubber industry's fourth annual conference on industrial accident prevention, held last November, is mentioned in the report. It refers to the Minister of Labour's opening address in which he congratulated the industry on measures taken to prevent accidents, particularly those on two-roll mills.

Disc brakes for two-roll mills used in the polymer industry are referred to as one of the chief engineering developments in accident prevention.

One of the conditions for safe working on these mills is that a brake must be used which will ensure that the rolls stop within one-eighth of a revolution. The report points out that the disc brake has advantages of higher resistance to 'fading,' immunity from the deleterious effects of penetrating water or french chalk, and constancy in performance in repeated applications. Wear on the friction pads is readily visible and is, to some extent, taken up automatically. Renewal of the pads can be carried out in a matter of minutes.

On two-rolls mills as little as 20% of the total kinetic energy is contained in the rolls and more rapid stopping can, therefore, be obtained by providing a clutch to disconnect the high speed drive so that the braking force need only be used to stop the rolls. A disc clutch (similar in operation to a disc brake) has been developed and, the report says, in trials where both types were used, the remarkably short braking distance of one inch travel on the roll surface (one-seventieth of a revolution) was obtained.

The provisions that apply in the application of protective coatings containing toxic solvents to vessels are stressed in the report. Rubber-proofed cylinders (Dracones) for use as liquid containers are quoted as one example. When work is done within the cylinder, the report says that 'the dangers from toxic vapour and fire have to be minimized by forced ventilation, by the use of flameproof electrical equipment, and by the provision of adequate breathing apparatus.'

Industry in General

Throughout industry fatal accidents in 1959 fell to the lowest figure reported this century, although there was a 'disappointing reversal' in the downward trend of the previous three years in the total number of accidents. The total number of accidents rose from 167,697 in 1958 to 174,071 last year, but the fatal accidents declined in the same period from 665 to 598.

'There has been no slackening in the efforts of the accident prevention movement,' writes the Chief Inspector, commenting on the increase, 'on the contrary, activities in this field have increased. The level of industrial production rose considerably during 1959 and the increase in accidents may be partially explained by the increase in the number of people employed.'

He also mentions the 'disturbing increase' in the number of accidents to young persons from 9,838 in 1958 to 11,001 in 1959.

USI Appointment

John Boardman, deputy chairman of Burtonwood Engineering, has been appointed deputy chairman of US Industries Inc. (Great Britain) Ltd. Bernard C. Shrubsole and Donald Giles will continue as joint managing directors.

Burtonwood was acquired by US Industries last October.

Serdix Rubber (London) Ltd. announce that their telephone numbers have been changed to UX3 5230 and UX3 5914.

E. V. Bird (*left*) **and H. A. Anderson** (*centre*) **of Cosmocord Ltd., examining a facia moulding for a tape recorder during a demonstration at Wolverhampton of the first British-made Lester 4-oz. Injection Moulding Machine which has been bought by Cosmocord. P. J. Shipton, general manager of the machine tool division of J. Brockhouse and Co., is with them. The machine, one of a batch of twenty now in production, will produce these facia mouldings at the rate of one every 28 seconds**

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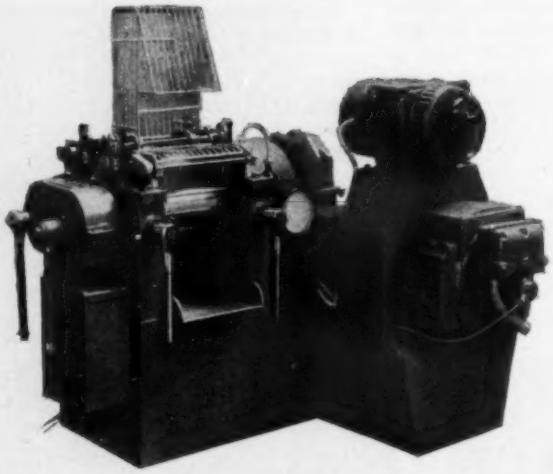

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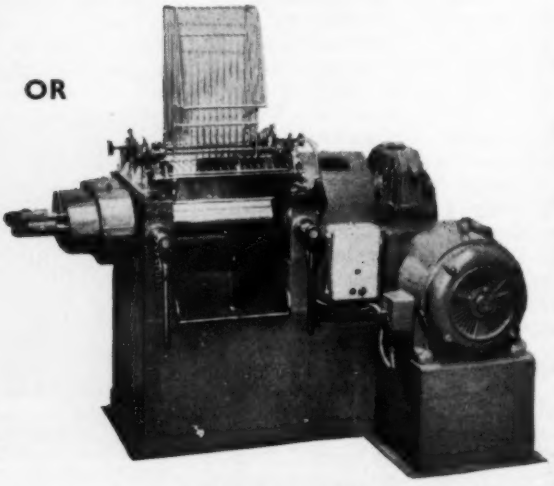

SINGLE SPEED

Rubber Statistics

MALAYA — WESTERN GERMANY

FOREIGN imports of rubber into Singapore and Malaya during August amounted to 23,767 tons, according to preliminary figures issued by the Chief Statistician.

This figure includes 9,173 tons imported on provisional permits in previous months, and excludes approximately 10,599 tons imported during the month for which final documents have not yet been received. The comparative figures for July were 33,710 tons, 19,073 tons, and 11,347 tons respectively.

Western Germany

West Germany's rubber tyre production during July fell further to 18,118 tons from 18,525 tons in June, according to the Federal Bureau of Statistics. July figures in these statistics are provisional; June figures are revised.

Production was, however, well above that of the previous year, for in the first seven months of this year production was 132,329 tons against 111,265 tons in the corresponding period of last year.

Output of other hard and soft rubber goods during July totalled 21,952 tons against 22,160 tons in June and 163,071 tons in the first seven months of this year compared with 130,759 tons (without the Saar Region) in the corresponding 1959 period.

Imports of natural rubber and rubber sole crepe in the first six months of this year totalled 74,933 tons, including 44,690 tons from Malaya, 6,421 tons from Nigeria, 5,833 tons from South Vietnam, 4,361 tons from Indonesia and 3,929 tons from Ceylon.

Imports of synthetic in the first six months of this year amounted to 24,578.7 tons (provisional), including 17,280 tons from the United States, 3,385.7 tons from Canada and 1,680.4 tons from Italy.

The US Department of Commerce announced that imports of natural rubber in July amounted to 25,072 tons, compared with 28,305 in June. Imports of latex were 3,483 tons, compared with 3,335 tons in June.

Nigeria

Rubber exports for May totalled 2,768 tons. Of this total the UK took 1,077 tons, Western Germany 588, Czechoslovakia 320, USA 110, and the Netherlands 15.

Crepe exports amounted to 2,575 tons cut of which 1,480 tons went to the US, and 785 tons to the UK.

A new range of sterilizable picnic ware recently put on the market by Aberdeen Combworks Co. Ltd., is moulded in Shell's Carlona polypropylene. The set is being marketed in four colours

COMPANIES in the NEWS

Lacrinoid

The offer made by F. Francis and Sons (Holdings) for the share capital of Lacrinoid Products has been accepted by holders of 77% of the ordinary capital and has been declared unconditional. The date for the receipt of acceptances has been extended to September 30.

The Board of F. Francis has now made arrangements to issue the £750,000 debenture stock, intimated last month. It will be 6½% mortgage stock 1981-85 which will be placed privately at £98¼%.

Boustead

Control of the far eastern business of Boustead and Co. has been transferred to Malaya. Concurrently, the company's business in the Far East has been formed into a public company with an issued capital of M$5m., one-quarter of which has been placed with the public through Fraser and Co., the Singapore stockbrokers.

Reichhold Chemicals

Reichhold Chemicals is maintaining the interim dividend in respect of 1960 at 7½% on capital increased by a one-for-eight scrip issue and a subsequent one-for-four rights issue. Dividends totalling not less than the previous 22½% were forecast for this year when the rights issue was made.

Mr Harry Wogden, plant superintendent of the Toronto factory of Dunlop Canada, has been appointed general works manager of India Tyre and Rubber Company, of Inchinnan, Renfrewshire.

Plastics Materials Sales

NET sales of plastics materials in the April-June quarter of this year were 143,107 tons — 12% up on the corresponding period of 1959. This is a much smaller increase than that of the first quarter of this year over the 1959 figure, which was 29% (*RJIP* June 25, 984). This position is shown by Board of Trade statistics based on returns made by 165 manufacturers of plastics materials.

Stocks were built up steadily over the period, and had increased by 20,000 tons. Stocks were mainly of thermoplastics (56,693).

The greatest rate of expansion continued to be in thermoplastics. Total sales in this group were 88,573 tons, compared with 79,300 tons in the 1959 period. Thermosetting materials sales amounted to 54,534 tons, compared with the 1959 figure of 48,300 tons. Polyesters sales have doubled over the period, although they are still relatively small at 2,511 tons.

Full figures, by quarters, for 1959 were published in *RJIP* March 19, 444.

Exports of plastics materials (excluding waste and scrap) in the second quarter were 42,300 tons; the same as in the first quarter of this year, and nearly 15% higher than in the second quarter of 1959. This again is a lower rate of annual increase than in recent quarters. Imports during the quarter rose to the very high level of 25,900 tons.

NET SALES OF PLASTICS MATERIALS, SECOND QUARTER 1960
(*in thousand tons*)

	April-June 1959	April-June 1960
Thermosetting materials:		
Alkyds	13.0	14.4
Aminoplastics	13.2	15.2
Phenolics and cresylics	18.3	19.2
Polyesters	1.7	2.5
Other (a)	2.1	2.9
Total thermosetting ..	48.3	54.5
Thermoplastic materials:		
Cellulose plastics ..	3.0	2.7
Polyvinyl chloride (b)..	24.3	26.0
Polystyrene	10.2	10.8
Polyvinyl acetate ..	3.8	4.0
Polythene }	38.1*	28.1
Other (c) }		17.0
Total thermoplastic ..	79.3	88.6
Total, all plastics materials	127.6	143.1
Stocks at end of period:		
Thermosetting materials	16.1	19.4
Thermoplastic materials	39.2	56.7

Note: Any apparent discrepancies are due to rounding of figures.
(a) Including epoxide-resins and casein plastics.
(b) Excluding sales of resins (*i.e.* polymers sold as such).
(c) Including acrylics, polyamides, polytetrafluorethylene, polyvinyl chloride resins (*i.e.* polymers sold as such).
* This figure includes polythene.

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Production of Moulds

No. 844,714. Firestone Tire and Rubber Co. Application and Filed, May 1 1958. Application in USA, May 20 1957. Published, August 17 1960.

In the production of moulds, particularly those for rubber tyres using the Shaw process, a flexible intermediate mat is used and this patent relates to the use of a pattern comprising a vulcanized copolymerized rubber which may be repeatedly re-used without the attendant difficulties associated with the polyvinyl compositions and thiokol polymers used previously.

Reinforcing Fabric

No. 845,744. Tibor Ambrus. Application, April 26 1956. Filed, October 31 1956. Published, August 24 1960.

A readily draped fabric for the reinforcement of mouldings is formed of a carrier layer of widely spaced thin parallel threads coated or impregnated with adhesive and a reinforcement layer of closely layed thicker layers or rovings extending transversely across the carrier layer threads and attached thereto by the adhesive on the carrier layer but not impregnated, so that the reinforcing layer is free of adhesive except at the points where the threads cross.

Interlaminar Adhesion

No. 845,908. Firestone Tire and Rubber Co. Application and Filed, May 27 1957. Application in USA, October 1 1956. Published, August 24 1960.

Relates to the improvements in the adhesion between layers formed of rubbery copolymers, particularly the laminates in a pneumatic tubeless tyre. Improvements are made in the adhesion between layers formed of rubbery copolymers of an isoolefin having from 4 to 7 carbon atoms and an open chain conjugated diolefin having from 4 to 8 carbon atoms and rubbery layers formed of copolymers containing a significant proportion of a diene such as isoprene or butadiene. More particularly the invention relates to an improved vulcanized bond between layers of so called butyl rubber and layers of synthetic rubber such as SBR. This is achieved by using a chlorinated butyl rubber and a resin such as 2,6-dimethylol-4-hydrocarbon substituted phenol resin.

Impregnated Fabric

No. 845,821. Goldschmitt Aktiengesellschaft. Application and Filed, September 5 1958. Published, August 24 1960.

A method of producing suitable continuous paper, textile and like fabric sheets impregnated with aminoplast resins for surfacing materials for laminates, fibre and press board, plywood and the like. These have two fundamentally contrary properties both essential to satisfactory processing, namely excellent flowability in the interior and lower flowability and rapid hardenability on the surface. This is achieved by a two stage impregnation process using first a highly flowable resin and then a less flowable rapidly hardening material.

Shorter Abstracts

Vulcanization Accelerators. 835,782. Farbenfabriken Bayer AG. Filed, February 27 1957. — Benzthiazole-2-dicycloalkyl-sulphenamides having 5 to 7 carbon atoms in each cycloalkyl nucleus are claimed as vulcanization accelerators.

Antiozonants. 835,826. The Firestone Tire and Rubber Co. Filed, November 19 1957. — Condensation products of (a) hydrocarbon dihalides containing 1 to 8 carbon atoms with (b) a substituted phenylenediamine are claimed as antiozonants for natural and synthetic rubber.

Polymerization of Ethylene. 836,305. Société des Usines Chimiques Rhone-Poulenc. Filed, April 14 1958. — A catalyst for the polymerization of ethylene under anhydrous conditions comprises (a) zirconium hydride, or (b) zirconium hydride mixed with a metal halide or oxyhalide, or (c) the product obtained by heating zirconium hydride with a metal halide or oxyhalide under anhydrous conditions in an inert atmosphere.

Preservation of Synthetic Latices. 836,335. The Dow Chemical Co. Filed, June 26 1958. — Nitroalcohols are claimed as preservatives for synthetic latices, particularly for styrene-butadiene copolymer latices containing a major proportion of styrene, as used in latex paints.

Natural Rubber Compositions. 836,393. The British Rubber Producers' Research Association. Communication from H. M. Edmondson of The Rubber Research Institute of Malaya. Filed, March 27 1956.—A reinforcing filler is mixed with natural rubber latex and the mixture coagulated and sheeted, the mixture being submitted to controlled heat treatment during coagulation and sheeting. The heat treatment ensures the production of a coherent sheet which dries quickly.

Compounding Rubber with Lignin. 836,578. The British Rubber Producers' Research Association. Communication from H. M. Edmondson of The Rubber Research Institute of Malaya. Filed, March 27 1956. — A high degree of structure is imparted to lignin-rubber compositions by milling the compositions at a temperature below 80°C. in the presence of 4 to 20% by weight of water, calculated on the lignin, and vulcanizing the moist compositions at a temperature between 120° and 170°C.

NEW OVERSEAS STANDARDS

The Canadian Standards Association has issued Revisions 23 to 41 to C22.2 No. 38, Rubber-insulated wires and cables.

The Society of Automotive Engineers Inc., USA, has issued the following Aeronautical Material Specifications (AMS 1960): 3633, Plastic tubing, electrical insulation. Irradiated polyolefin, heat shrinkable. 3635A, Plastic sheet: cellular, shock absorbing (closed cell, foamed, modified vinyl sheet). 3780, Copper wire: polytetrafluoroethylene covered, miniature. 3940C, Fibreboard, hard pressed, structural.

Standards newly issued by the Association Française de Normalisation include (AFNOR 1960): NF J 71–100, Rubber insulated 250 and 750 volt marine type cables: rules. NF J 71–101/2 and 104, Rubber insulated 750 volt marine type cables. NF J 71–111/114, Rubber insulated 250 volt marine type cables.

Deutscher Normenausschuss standards recently issued include (DIN 1960): 7751 Bl.4, Unfinished strip for retreading vehicle tyres: PV strip for round soling of tyres with coarse and deep thread.

The Ente Nazionale Italiano di Unificazione has included the following anonymous standards (UNI 1960): 4271, Funnel method of determining flow properties of particles of plastics moulding materials.

From Switzerland, Schweizerischen Normen-Vereinigung Standards (SNV 1960) include: 24 737, Rigid PVC base conduit. 24 738, Bendable polythene base conduit. Plastics: 77200 F.1, Synopsis of films and sheets. 77200 F.2, Synopsis of thermosetting mouldings. 77200 F.3, Synopsis of thermosetting castings. 77200 F.4, Synopsis of thermoplastics moulding. 77200 F.5, Synopsis of thermoplastics plates and sections. 77200 F.6, Synopsis of elastomers. 77200 F.7, Synopsis of foamed products (cellular materials); 77200 F.8, Synopsis of laminates. 77200 P.1, Synopsis: explanations.

The above standards have been added to the library of the British Standards Institution, 2 Park Street, London, W.1. They are available to members on loan, or for sale from the Sales Branch

Plantation Share Survey

MANY of the leading rubber shares have staged a rally recently following the partial recovery in the price of the raw material. Spot rubber in London averaged 28⅛d. per lb. last month, bringing the figure for the first eight months of the year to 34⅛d. This compared with a little under 28d. for the corresponding period of 1959 and with 30⅝d. for the whole of last year. American rubber trade statistics continue to reflect the damaging effects of recent high prices for the natural material. July figures indicate a further reduction in the natural quota to 30½% with a consumption level of 35,085 tons from total new rubber consumption — including synthetics — of 115,070 tons. In particular the market for natural latex has been hit quite considerably by synthetic competition, American manufacturers having used only 2,725 tons in July against over 5,000 tons in the same month a year ago. Total for the seven months comes to 30,355 tons as compared with 42,573 tons in the same period of 1959. On the other hand consumption of synthetic latices has increased from 46,535 tons to 51,998. For the whole of last year the eastern material supplied 46% of the latex market in the USA but the latest month's quota is now less than 29%.

From the latest report made by the receiver for the debenture holders it appears that the anticipated WATERFALL (SELANGOR) RUBBER capital reorganization plan may be submitted when the accounts for the year ending this month are available. The basis which is likely to be proposed involves writing down the ordinary from 2s. to 8d., and the offer to Loan Note holders of ordinary shares in the reduced form of a nominal value of 30s. for each 20s. of Loan Notes including arrears of interest. At present the issued capital consists of £335,148 ordinary, £30,000 of 5% Loan Notes (with interest in arrear from January 1942) and £43,784 of 7% debenture stock. It is assumed that the balance of the latter debt will be repayed when the reorganization plan has been carried through. On the suggested basis the issued capital, including stock issued to note holders, will be reduced to £156,716, representing a charge of £60 per acre on the company's remaining rubber area of around 2,600 acres. On current crops the earning capacity would be about 2½% gross for every 1d. per lb. profit.

CHULSA (SELANGOR) RUBBER announced that they have received tentative enquiries for the company's property, and firm offers are being invited. The directors said that they are prepared to accept reasonable terms, in view of the trend towards larger units. Stockholders they said could expect to learn of possible developments along these lines in due course. The £1 shares have been notably firm for some time having so far this year appreciated from 38s. 9d. to 54s. 9d. At the current level the net market valuation works out at about £120 per acre of rubber.

RINI (MALAYA) RUBBER has decided to clear off its 10% debenture issue of which some £42,100 is at present outstanding. Stockholders have the right to exchange their holdings for 1s. stock units at par until the end of the month and any balance then outstanding will be repaid at 105. The sister company BUKIT MERTAJAM RUBBER holds over 80% of the issue and intends to take up shares. Other holders should also convert since the 1s. units are quoted in the market around 1s. 7¼d.

In 1958 the Malayan rubber loan and agency corporation acquired a 48% stake in the equity of GUTHRIE AND CO., the well-known firm of Eastern merchants and agents for some of the most successful of the Malayan rubber producing companies. Of the purchase consideration of approximately £589,000, a balance of £324,000 is still outstanding. This loan is interest free until April 1966 with a charge of 1% above Bank rate after that date. It is repayable at the discretion of the directors subject to the payment of a minimum annual dividend of 10%. In view of these circumstances it is rather surprising that the announcement of a dividend at this rate for the year to June 30 last occasions some disappointment and led to a small fall in the market price of the 2s. stock units. The board are unlikely to pay any higher rate until the loan account has been eliminated or very considerably reduced. In between times the value of the shares should be determined by the long term prospect rather than by considerations of the current dividend yield which is admittedly but justifiably meagre. Apart from the Guthrie holding the company has general investments with a market value of £44,400, and other net liquid assets of around £13,000. And it is not difficult to see that the Guthrie interests far outweighs other assets. The current report did not give any up-to-date information concerning the present value of this holding but last year the chairman reported that Guthrie and Co. had fixed assets of £1,350,000 and net current assets of £1,622,000, giving the $10 (Malayan) shares a net asset value of a little over 93s. In all probability the position has improved in the meantime as the maintained Guthrie dividend of 10% has absorbed only £48,300 from net profits of £146,300. On the basis of the 1959 assessment, the Guthrie investment is worth about £1,340,000, giving the 2s. units of the holding company an asset value of approximately 12s., allowing for the loan account and for the company's other interests. Elimination of the loan account would be effected fairly soon if as is anticipated in some quarters a cash distribution is received from the considerable liquid assets held by Guthrie and Co.

Although the estates of CHEMBONG MALAYA RUBBER are capitalized at a fairly high figure relative to most other Malayan plantations of £95 per acre of rubber the company has an excellent dividend record. Apart from the high quality of the planted areas the favourable results have been due in no small measure to the production of premium rubber grade including concentrated latex. Last year's net sale average was, in fact, as high as 31.3d. per lb. compared with 23d. in 1958-59, resulting in a bumper dividend of 35%. The 1959-60 output of 2,082,000lb. compared with 1,874,000lb.

As is the case with almost every other concern today production costs were higher. In this case they worked out at 19d. per lb. in place of 17½d., the rise stemming from an increase of almost 2½d. per 6d. per lb. in charges for shipping, export duty and cesses. The dividend and taxation charges fully absorbed the trading balance of £123,500. After crediting Government grants the net outlay on replanting amounted to only £1,300. Net liquid assets of the company now figure at £75,800 equal to £21 per acre on the rubber area of 3,627 acres, apart from a trade investment KUALA PAHI DEVELOPMENT. The holding comprises 147,000 £1 shares and represents 582 acres mature rubber, 634 acres immature rubber and a further 214 acres in course of planting. The rubber crop so far this year is running on much the same basis in 1959-60. It is, however, doubtful whether the selling price will again be so favourable especially as the market for concentrated latex has taken something of a knock through synthetic competition.

SHELFORD RUBBER recently climbed to the highest point of the year following news that its directors had rejected an Eastern offer of just over £300 per acre for an estate of 636 acres of which 625 acres were planted with rubber. It was stated that the offer did not reflect the full value of the estate which has a considerable potential value for building development. The board it turns out is, in fact, considering a scheme which will increase asset value and particulars of the plan are expected in the near future. In the meantime it has been noted that the current market valuation of the two estates — including one of 674 acres in Perak, which presumably has no special value except as a rubber producing unit — works out at about £235 per acre.

Rubber Markets

LONDON

Prices moved to higher levels, partly in sympathy with the Singapore market and also on short covering, especially of landed positions up to the end of the year. Physical rubber was slow at first, but later a moderate demand developed. Earlier in the week sellers were reserved, but later offered rather more freely on the higher price basis.

Latest prices are as follows:

No. 1 RSS Spot: 30d. nominal.

Settlement House:

October 30d. nominal.

November 29⅞d.-30⅛d.

December 29⅛d.-29⅜d.

October/December 29⅞d.-30⅛d.

January/March 29⅛d.-29⅜d.

April/June 28⅞d.-29d.

July/September 28⅝d.-28⅞d.

No. 1 RSS cif basis ports:

October 29⅛d.-29⅜d.

November 29⅛d.-29⅜d.

Godown:

October 101¼ Straits cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, October, November, 16s. 7d., cif European ports. Spot, seller, 17s. 3d. Bulk, nominal, d.w. 16s. 10d. nominal. Creamed, seller, 16s. 3d. cif nominal, October, November. Normal, seller, October, November, 14s. 2d.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on September 12 was 32.25 (32.25) US cents per lb.

DJAKARTA

The market ruled steadier on September 12. Transactions of sheet No. 1 for ready delivery amounted to about 20 tons at 36.50 rupiahs per kilo. No transaction in sheet No. 2 were reported as buyers could not meet sellers' offers at 36 rupiahs per kilo.

	Rupiahs per kilo	
	Sept. 12	Prev.
Spot No. 1 priok ..	36.00b	36.00b
Spot No. 2 priok ..	35.00b	35.00b
Spot No. 3 priok ..	32.50b	32.50b
No. 1 fine pale crepe, spot	35.00b	34.50b

Tone: Steadier.

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on September 12 was 108¼ (109) Ceylon cents per lb.

SINGAPORE

The market ruled very quiet throughout the morning of September 12. Interest was confined almost entirely to No. 1 RSS for October delivery. Lower sheets and offgrades were neglected. In the afternoon, prices fluctuated within narrow limits in quiet dealings. Interest in lower grades was small. After hours, quiet conditions prevailed.

	Malayan cents per lb., fob Malayan ports to open ports	
	Sept. 12	Prev. Close
No. 1 RSS, Sept.	100 –100¼	100¼–100½
Oct.	100⅛–100⅜	100¼–100½
No. 2 RSS, Sept.	99½– 99¾	99½–100
No. 3 RSS, Sept.	98¾– 99¼	98½– 99
No. 4 RSS, Sept.	96½– 97½	96½– 97⅜
No. 5 RSS, Sept.	92½– 93½	92½– 93½
No. 1 RSS, Spot	100 –100⅛	99⅞–100⅜
No. 3 blanket thick remilled crepe, Sept. ..	85 – 86	85 – 86
No. 1 fine pale crepe, Sept. ..	106½–108	106½–107½
2x thin brown crepe, Sept. ..	84½– 85⅛	84½– 85⅛

Tone: Quiet

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 190.40d. per gallon.

NEW YORK

The New York rubber market ruled as under on September 12:

DEALERS' PRICES

	US cents per lb., ex-dock	
	Sept. 12	Previous
No. 1 RSS, Sept. ..	34¼a	34⅛b–34⅜a
Oct. ..	34¼a	33⅞b–34⅛a
No. 2 RSS, Sept. ..	34⅛a	34b –34¼a
Oct. ..	34a	33⅞b–34a
No. 3 RSS, Sept. ..	34¼a	33⅞b–34⅛a
Oct. ..	33⅞a	33⅝b–33⅞a
No. 1 RSS, Spot ..	35n	34⅜n
No. 3 amber blanket crepe, Sept. ..	27⅛n	27⅛n

FUTURES—REX CONTRACT

	Sept. 12	Prev. Close
Sept. ..	34.50b–35.10a	34.40b–35.00a
Nov. ..	33.90t	33.90t
Jan. ..	33.40–33.50t	33.30t
March ..	32.90b–33.10a	32.90b–32.95a
May ..	32.60b–32.80a	32.60b–32.75a
July ..	32.45b–32.70a	32.45b–32.60a
Sept. ..	32.35b–32.60a	32.35b–32.50a

Sales: 35. Tone: Steady.

Futures were steady in light dealings on September 12. Traders said that the hurricane Donna hampered trading. Physical rubber was quiet and steady.

AMSTERDAM

The Amsterdam rubber market ruled as under on September 12:

	Guilders per kilo	
No. 1 RMA	Sept. 12	Previous
Sept.	2.84	2.83
October	2.83	2.82
November	2.82	2.81
December	2.81	2.80
October/December ..	2.82	2.81
January	2.77	2.76

Sales: 60. Tendency: Quiet.

30 Bags a Minute

A miniature, portable band-sealer for the continuous sealing of polythene bags—at a speed of roughly 30 a minute — is among the new products which will be on show at the Fresh Food Packaging Exhibition at Alexandra Palace, London, November 1-4.

A new twist-wrapper, from France, which can be supplied with a semi-automatic weighing and filling unit, will be exhibited.

Over 70 firms with stands occupying well over 20,000 sq. ft. of floor area, are exhibiting at Alexandra Palace.

Among the exhibitors will be Anglo-American Plastics Ltd.; British Visqueen Ltd.; Commercial Plastics Ltd.; Cascelloid; Iridon Ltd.; Lustroid Ltd.; Metal Box Co. Ltd.; and Whiffen and Sons Ltd.

50 years with Morris Ashby

The directors of Morris Ashby Ltd. invited Mr W. H. Chambers and some of his senior colleagues to lunch at the Abercorn Rooms, London, last week to celebrate his completion of 50 years' service. Mr Chambers joined the staff of Morris Ashby in 1910 and in 1924 went to Hull where he has since represented the company and their associate company Columbian International (GB) Ltd. Mr Chambers was presented with a gold watch by the directors and a transistor radio on behalf of the staff.

A range of new vinyl safety 'nite-lites' is being introduced by Combex Ltd., a member of the Dunbee group. Retail prices will range from 17s. 11d. to 24s.

It's horse sense that a rubber bucket is better for general stable use. This new type is made by Dunlop from Fortiflex rubber resin compound, which combines the properties of rubber and phenolic resins

Industry INTELLIGENCE

Technical Data

Hypalon Paints

The photographs in paint bulletin PB-11 available from Du Pont (UK) Ltd., 76 Jermyn Street, London, S.W.1, show the condition of Hypalon paint after weathering two to four years in Delaware. In all cases the Hypalon paints have demonstrated outstanding film integrity, in contrast to the more conventional paints, which have failed because of mildew, flaking, cracking, erosion, or blistering.

Summarized in the bulletin are the results to date of an extensive test programme undertaken to determine the weathering characteristics of paints based on Hypalon synthetic rubber. When the programme was started, Hypalon had already been in use for several years in garden hose, tarpaulins and other products used outdoors — and had demonstrated excellent resistance to sunlight and weather. There was, however, no evidence to show that these properties would also exist in paint films.

Epoxy Solvent Systems

Suggested solvent systems for Harcure A epoxy mixtures are given in Technical Data Sheet No. 19A issued by the Geigy Company Ltd., Rhodes, Middleton, Manchester. These materials are not soluble at room temperature in toluene, ketones, xylene, acetates or naphtha, but are soluble in hydrocarbons at 50-60°C., and methylene chloride at room temperature. Suggested solvent systems are binary systems of toluene with either methylene chloride 2-nitropropane or tetrahydrofurane, or tertiary systems of these solvents.

Abrac Aluminium Stearate

Aluminium stearate has many applications, as a thickening agent for inks, oils and greases, for gelling plasticizers, as bodying and pigment agents in paints, in paper coating compositions, and for waterproofing applications for textiles, paper, wood and building materials.

Technical information concerning the use of the three grades of aluminium stearate supplied by them are given in a recent publication by A. Boake, Roberts and Co. Ltd., Abrac Works, Stratford, London, E.15, reference No. 151c.

Compounding with Synpols

The effects of polymer selection and compound loading on physical properties of mechanical goods compounds are discussed in Synpol application bulletin No. 3, issued by Texas-US chemical Co., 260 Madison Avenue, New York 16.

The bulletin contains the results of recipe variations using a Synpol carbon black masterbatch at various clay loadings and a variety of clear Synpol extended and non-extended polymers in two recipes. In both cases the compounds were tested for the most significant properties in order to develop some general rules concerning compounding, cost and processibility factors were not the primary variables.

Dunlop SBR Latex

Politone K.900 is a high styrene latex recently developed by Dunlop Chemical Products Division. This has been formulated with the needs of the paper coater in mind and has good mechanical stability, freedom from large particles and exhibits a minimum tendency to foaming. Clay coating compositions containing Politone have a high pick value and give very good gloss on calendering. Total solids content is 48%, viscosity about 200 centipoises and particle size is mainly 0.2 microns. Further information and advice can be obtained from Dunlop's Chester Road Factory, Erdington, Birmingham 24.

Machines, Materials and Equipment

Welding Plastic Sheets

A process is described in European Technical Digest which permits the homogeneous bonding of two sheets of thermoplastic material. The bond has excellent mechanical strength and the seams are free of burrs.

The process uses a tape incorporating a metal core sandwiched between adhesive tapes. The tape is laid over one or both faces of the joint. An electric current is applied across the resistive metal core. The core heats up, plasticizing the plastic tapes which overlap the two sides to be joined. The tapes bond with the surfaces of the joint, the cold state of the assembled parts preventing any running of the plasticized material, even under the pressure of a swaging roller or a smoothing block.

All thermoplastic materials can be welded by this method, in particular, high and low-pressure polythene, polystyrene, plasticized PVC and nylon-type polyamides.

The equipment required for the application of the process consists of a few simple tools and of an auto-transformer capable of an output of 40 A./10V. per metre length of weld tape.

Typical applications include the welding of plastic skins over tank walls, the fabrication of plastic tarpaulins, of plastic ducts, and the sealing of large-size wrappings, etc.

Publications

Development Products

The first of a series of six monthly reports on new chemical developments by the company has just been published by Joseph Crosfield and Sons Ltd., Warrington. These reports are an attempt to bridge the gap between pilot plant production and the establishment of larger manufacturing facilities, and to give the chemical and processing industries early news of developments. The brochure gives the names of materials under development, suggested uses for them and the quantities available. The availability of new materials for consumer research at an early stage of development will either substantiate research claims or point to possible modifications which are generally easier to carry out at the pilot plant stage.

Microhardness Testing

The need frequently arises in industrial laboratories to test small oddly shaped pieces of rubber and as these cannot be tested by normal methods, special tests have to be devised. Hardness measurements in particular can be carried out on specially designed microhardness testers, but there is often some doubt as to the equivalence of the results between these micro and the more normal tests.

Research report number 98 recently issued by RABRM is on microhardness testing, its possibilities and limitations, and is a revised form of a paper presented at the International Rubber Conference in Washington in 1959.

Attention is drawn to the mechanical difficulties arising in the devising of such a test and the ways in which these have been overcome are described. Experimental results are presented showing the good correlation between micro and normal tests, and attention is drawn to the influence in the size of the test piece. The conclusion is that reliable measurements can be made on much smaller and thinner specimens than in the standard test, but that there are minimum dimensions below which even the micro test does not give results agreeing with those of the normal test.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

KLEEWARE (B798,882) All goods included in Class 18. Kleeware Plastics Ltd., 17 Winchester Road, London, N.W.3. (Class 18; August 23 1960).

AIR-MUFF (801,150) Tubular jointing members, made wholly or principally of wood or of plastics, for use in the erection of frameworks. Nathaniel Jones Ltd., 1 Blandford Street, London, W.1. (Class 20; August 23 1960).

BONOWELL (803,705) Synthetic resins for use in manufactures. Aktiebolaget Bofors, Bofors, Sweden. Address for service is c/o Allam and Tregear, 2-3 Norfolk Street, Strand, London, W.C.2. (Class 1; August 30 1960).

ELIOLENE (803,927) Plastics in the form of powders for industrial use. Elio Malizia, trading as Dott Elio Malizia, 23 in Viale Piceno, Milan, Italy. Address for service is c/o Potts and Co., 15 Hamilton Square, Birkenhead. (Class 1; August 30 1960).

DOOD (805,877) Adhesive substances for use in industry. Plastic Liners Ltd., Design Works, Three Colt Street, London, E.14. (Class 1; August 30 1960).

RED ADMIRAL (802,871) Boats. The Avon India Rubber Co. Ltd., 'Avon' India Rubber Works, Melksham, Wiltshire. (Class 12; August 30 1960).

FINE-WELL (792,434) Paper bags; and bags for wrapping, packaging and display purposes, all being made of flexible transparent plastics. Bemis Bro. Bag Co., 601 South Fourth, Saint Louis, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. (Class 16; August 30 1960).

REGENT SOVEREIGN

(800,956) Tyres for vehicle wheels. The Marsham Tyre Company Ltd., Jubilee House, 207-213 Oxford Street, London, W.1. (Class 12; August 30 1960).

RESISTAL-WELD (792,436) Paper bags; and bags for wrapping, packaging and display purposes made of flexible transparent plastics. Bemis Bro. Bag Co., 601 South Fourth, Saint Louis, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. (Class 16; August 30 1960).

SLUMBAFOAM (B793,515) Divans, mattress bases, bedding (other than bed clothing), mattress pads, pillows (not for surgical or curative purposes), and bolsters, all being goods made of or incorporating foamed rubber or foamed plastics. Slumberland Ltd., Redfern Road, Tyseley, Birmingham, 11. (Class 20; August 30 1960).

NEW COMPANIES

S.S. Tyres Ltd. (668,165).—August 19. Capital: £1,000 in £1 shares. The directors are: Stanley F. Stevens and Mrs Patricia M. H. Stevens, both of Burgate, Lansdown, Guildford, Surrey. Regd. office: Dapdune Farm, William Road, Guildford, Surrey.

H. W. Carter & James Ltd. (668,289).—August 23. Capital: £100 in £1 shares. To carry on the business of wire workers, weavers and drawers, japanners, galvanizers, makers and manipulators of plastics. The directors are: Gilbert J. Price, 30 Petersfield Road, Hall Green, Birmingham, 28; Albert E. Whitmarsh, 203 Moor Green Lane, Moseley, Birmingham, 13; directors of Wirax Wirewares Ltd. Regd. office: Balsall Heath Wireworks, Wenman Street, Birmingham, 12.

Walkie Strip Ltd. (668,127).—August 19. Capital: £500 in £1 shares. To carry on the business of workers in plastics, synthetic fabrics and materials. The directors are: Terence H. Godsmark, 53 Venner Road, Sydenham, S.E.26; James W. H. Channer, 40 Mayford Road, Wandsworth Common, S.W.12. Regd. office: 134/6 Curtain Road, E.C.2.

Wilman Plastics Ltd. (669,025).—August 31. Capital: £100 in £1 shares. The directors are: Leonard E. Wildy, 177 Norwood Road, S.E.24; William L. Brown, 117 Paulet Road, S.E.5. Regd. office: 16/17 Little Britain, E.C.1.

Florhyl Ltd. (668,966).—August 31. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in chemicals, plastics, etc. Solicitors: Howe and Rake, 22 Chancery Lane, W.C.2.

Aldisco Ltd. (668,962).—August 31. Capital: £7,500 in £1 shares. To carry on the business of general merchants, etc. Solicitors: Anthony U. Banfi, Liverpool.

Lechyl Ltd. (668,971).—August 31. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in chemicals, plastics and synthetic materials, etc. Solicitors: Howe & Lake, 22 Chancery Lane, W.C.2.

Changes of Name

Cawley Plastics Ltd. (592,510), 55 Brown Street, Manchester, 2.—Name changed to Tough Plastics Ltd. on March 1, 1960.

Gilnow Manufacturing Co. Ltd. (295,612), manufacturers of and dealers in surgical fabrics, etc., 26 East Parade, Bradford, 1. —Name changed to City Linings Company Ltd. on February 5, 1960.

Cormorant Display Ltd. (558,154), plaster and rubber goods manufacturers, etc., 42 Devonshire Street, W.1.—Name changed to Daras Ltd. on March 2, 1960.

Increases of Capital

C. M. Boak Tyre Service (Derby) Ltd. (375,823), 2 Kings Walk, Nottingham.—Increased on January 29 1960 by £20,000, in £1 ordinary shares, beyond the registered capital of £5,000.

Flameless Ltd. (224,457), non-inflammable rubber solution manufacturers, etc., 76 New Cavendish Street, W.1.—Increased on February 15 1960 by £4,500 in £1 ordinary shares, beyond the registered capital of £500.

This lorry cover is an experimental sheet produced by Gourock Ropework Co. from a core spun yarn composed of a nylon 'core' and cotton sheath. It is chemically dry proofed and is similar in characteristics and appearance to a conventional natural fibre sheet except that it is lighter in weight and considerably stronger. The sheet weighs only about 12 oz./sq. yd. but has a breaking strain of 379 lb. in the warp.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on August 17 1960

British United Shoe Machinery Co. Ltd. Apparatus adapted for use in producing coherent moulded articles from powder. 845,009.

Consortium Für Elektrochemische Industrie G.m.b.H. Process for the manufacture of partially acylated polyvinyl alcohol. 844,866.

Montecatini Societa Generale per L'Industria Mineraria E. Chemica. Linear polymers of vinyl hydrocarbons and process for their preparation. 844,944.

H. Koch and V. Koch (née Ritter), trading as Ritterwerk F. Ritter and Sohn. Injection moulding. 845,022.

International Resistance Co. Methods of bonding metals to organic fluorocarbon plastic materials and articles made thereby. 844,776.

Foster, Yates and Thom Ltd. (R. Wucher). Injection moulding apparatus. 844,867.

Union Carbide Corporation. Polyepoxide heat hardenable and heat hardened compositions and a process for their preparation. 845,121.

Imperial Chemical Industries Ltd. Organopolysiloxane compositions. 844,780.

S. Yamaguchi. Method of welding nylon and other fabrics made of synthetic fibres by high frequency energy. 845,307.

Sonsthagen L.A. Processes of preparing pigmented coating products and pigment dispersions in resins and other binders and/or solutions of these. 844,786.

Union Rheinische Braunkohlen Kraftstoff A.G. Process for the purification or separation of terephthalic and isophthalic acids, and the monoesters and polyesters thereof. 844,957.

Imperial Chemical Industries Ltd. Rubber compositions. 844,958.

British Rubber Producers' Research Association, and United Kingdom Atomic Energy Authority. Production of polymer compositions. 844,791.

Goodyear Tire and Rubber Co. Cord-to-rubber bonding adhesive and method. 844,795.

Firestone Tire and Rubber Co. Apparatus and method of manufacturing rubber articles. 844,887.

Firestone Tire and Rubber Co. Apparatus for manufacturing rubber articles. 844,888.

Resistoflex Corporation. Prestressed polytetrafluoroethylene tube and method of making same. 844,895.

Pritchett and Gold and E.P.S. Co. Ltd. Porous plastic sheeting. 844,801.

Imperial Chemical Industries Ltd. Ethylene polymerization. 844,656.

Phillips Petroleum Co. Carbon black pelleting process and apparatus. 845,041.

Phillips Petroleum Co. Process for the purification of polymerizable heterocyclic nitrogen compounds. 844,981.

Accumulatoren-Fabrik A.G. Process and plant for the manufacture of porous plastic plates. 844,551.

E. I. du Pont de Nemours and Co. Anhydride hardeners for polyepoxides. 845,057.

L. Patella. Process and apparatus for manufacturing hollow articles of a thermoplastic material. 845,069.

P. Spence and Sons Ltd. Flame-retardant polymers. 844,555.

Farbenfabriken Bayer A.G. Process for the production of polyethers. 845,067.

Bataafsche Petroleum Maatschappij N.V. De. Catalytic polymerization of olefins, the resulting polyolefins; and reaction media for the catalytic polymerization of olefins. 845,073.

Compagnie de Saint Gabain. Manufacture of thermoplastic fibres. 844,991.

Chemische Werke Hüls A.G. Working up of low pressure polyolefines. 844,832.

Owens-Illinois Glass Co. Method of and apparatus for making plastic articles. 844,917.

E. I. du Pont de Nemours and Co. Production of organic nitriles. 845,086.

Farbenfabriken Bayer A.G. Process for the polymerization of chloroprene stabilized with phenthiazine. 844,592.

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Esso Research and Engineering Co. Catalytic polymerization of olefins. 845,100.

Latest Wills

W. H. Franklin, of Vicarage Flat, Thorpe-le-Soken, Essex, Chairman of J. G. Franklin and Sons Ltd., and a former president of the Research Association of British Rubber Manufacturers, who died on April 26, left £5,560, £2,133 net value.

Lady Mary Edythe Lever, of Northlands, Winchester, Hants, widow of Sir Samuel Hardman Lever, a director of Dunlop Rubber Co. Ltd., who died on June 10, left £142,507 gross, £137,536 net.

Mr Alfred Clive Gardiner, of 30 Elm Park Road, Chelsea, S.W., artist, late Principal of Goldsmiths' School of Art, who died on May 15 last, left £30,789 gross, £20,081 net value. Mr Gardiner was well known for his decorations at the Rubber Pavilion at the Wembley Exhibition—a series of designs in the production of rubber.

R·I·P·

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INDEX to ADVERTISERS

Page numbers below indicate the last occasion on which an advertisement appeared in this volume. Where the advertisement appeared on the covers or in the supplement, the figure in parentheses is the number of this issue

	Page
A.E.W. Ltd.	ix
Allcock, J., & Sons Ltd.	iv (10)
Amalgamated Oxides (1939) Ltd.	v (6)
Anchor Chemical Co. Ltd.	Cover i
Anderson, Joseph, & Sons Ltd.	i
Armour Hess Chemicals Ltd.	—
Associated-Rediffusion Ltd.	—
Astor Boisselier & Lawrence Ltd.	206
Baker Perkins Ltd.	431
Barfoot, T. W., & Webb, W. F.	405
Barwell Engineering Ltd.	v (8)
Belgrave Industries (Exports) Ltd.	29
B.I.P. Chemicals Ltd.	ix (11)
Birch, Singleton, W., & Sons Ltd.	443
Boston Marine & General Eng. Co. Ltd.	351
Bramor Ltd.	75
Bridge, David, & Co. Ltd.	413
Bright, John, & Bros. Ltd.	ii
British Electrical Development Association	427
British Geon Ltd.	v
British Nylon Spinners Ltd.	ii (11)
British Recovered Rubber Co. Ltd.	v (11)
British Resin Products Ltd.	vii
British Titan Products Co. Ltd.	x
Bush Beach & Segner Bayley Ltd.	88
Cabot Carbon Ltd.	417
Carter Bros. (Rochdale) Ltd.	vi
Carlton Press Knives, Ltd.	405
Catalin Ltd.	—
Chemical & Insulating Co. Ltd., The	—
Cleggswood Oil Distillery Ltd.	293
Cohen, George, Sons & Co. Ltd.	—
Collison Engineering Co. Ltd.	—
Columbian International (Gt. Britain) Ltd.	iii
Consolidated Zinc Corporation (Sales) Ltd.	vii (9)
Crosfield, Joseph, & Sons Ltd.	423
Croxton & Garry Ltd.	444
Cruickshank, R., Ltd.	—
Davis Plastics Ltd.	—
Draper, Henry, & Co. Ltd.	—
Dietzel, Hugo	iv (2)
Dixon, T. H., & Co. Ltd.	i (9)
Dunlop Rubber Co. Ltd.	414
Du Pont Co. (United Kingdom) Ltd.	369
Durham Raw Materials Ltd.	viii
Economist Intelligence Unit Ltd., The	—
Ellison, George, Ltd.	viii (11)
English Clays Lovering Pochin & Co. Ltd.	443
Esso	380-381
eur-O-matic	405
Factice Research & Development Assoc.	—
Fawcett Preston & Co. Ltd.	iv (11)
Fellner & Ziegler GmbH.	—
Ferguson, A. O., & Co. Ltd.	xi (11)
Ferguson, James, & Sons Ltd.	xiii (11)
Ferguson Shiers Ltd.	202
Firestone Tyre & Rubber Co. Ltd.	255
Foamair Ltd.	vi
Forrest, H., & Sons (E.P.M.) Ltd.	—
Gardner, Henry, & Co. Ltd.	—
General Utilities (Stockport) Ltd.	vi (6)
Goodyear Tyre & Rubber Co. Ltd.	388
Grantham Rubber Machinery Co. Ltd.	—
Greeff, R. W., & Co. Ltd.	306
Gresham & Craven Ltd.	ii (6)
Gummi und Asbest	ix (9)
H. K. Import & Export Ltd.	vi (10)
Halsteads Engineers (Leyland) Ltd.	xi (11)
Hankin, Geo., & Co. Ltd.	367
Hardman & Holden Ltd.	234
Hatcham Rubber Co. Ltd.	viii
Hay & Robertson Ltd.	428
Hercules Powder Co. Ltd.	—
Hilton, Wallace, & Co. Ltd.	443
Hodgson, Richard, & Sons Ltd.	—
Hubron Rubber Chemicals Ltd.	Cover iii (10)
Hughes & Hughes Ltd.	viii (9)
Hunt Heat Exchangers Ltd.	223
Iddon Bros. Ltd.	xiv (11)
Imperial Chemical Industries Ltd. (Billingham)	135
Imperial Chemical Industries Ltd. (Dyestuffs)	411
Imperial Chemical Industries Ltd. (Plastics—Butakon)	Cover ii
Imperial Chemical Industries Ltd. (Terylene)	375
Institution of the Rubber Industry	21
International Corporation Ltd.	vi (11)
International Synthetic Rubber Co. Ltd.	373
Ioco Ltd.	331
K. W. Chemicals	379
Kautschuk und Gummi	185
Kendell, T., & Sons Ltd.	394
Ketjen Carbon	56, 57
Latex Engineering Co.	432
Lavino (London) Ltd.	—
Leeds & Bradford Boiler Co. Ltd., The	iv (10)
Lonabarc Ltd.	x (11)
Lord, R., & Sons Ltd.	viii
Marsman, G. J.	—
McKechnie Bros. Ltd.	202
Maclaine, Watson & Co. Ltd.	vii (1)
Micafine Ltd.	vi (11)
Monsanto Chemicals Ltd.	385
Muehlstein, H., & Co. (London) Ltd.	406
Muller, Max	vii (2)
National College of Rubber Technology	—
Nederlandsch Verkoopkantoor Voor Chemische Producten N.V.	56, 57
New Conveyor Co. Ltd.	428
Northwestern Rubber Co. Ltd.	xii (11)
Novadel Ltd.	iii (10)
Oldham, Thomas, Ltd.	—
Oswald & Duncan Ltd.	xii (11)
Philblack Ltd.	408
Phoenix Rubber Co. Ltd.	ii (9)
Planters Engineering Co. Ltd., The	vi (4)
Polymer (United Kingdom) Ltd.	299
Preston Tyre Fabric Manufacturing Co. Ltd.	xiii (11)
Price's (Bromborough) Ltd.	377
Pullen, James H., (1942) Ltd.	434
Reed Bros. (Eng.) Ltd.	393
Revue Generale du Caoutchouc	293
Rhein-Chemie GmbH.	x (11)
Robinson Bros. Ltd.	viii (10)
Robinson, Joseph, & Co. Ltd.	353
Rotunda Ltd.	—
Rubber Age (New York) Ltd.	iv (6)
Rubber Latex Ltd.	434
Rubber Regenerating Co. Ltd., The	Covar iv
Shaw, Francis, & Co. Ltd.	iv
Shell International Chemical Co. Ltd.	317
Shell Mex & B.P. Ltd.	—
Smith, Alfred, Ltd.	iii (3)
Smith, Wilfrid, Ltd.	394
Sondes Place Research Laboratories Ltd.	—
Squire, Frederick, Ltd.	407
Stechler, L., & Co. Ltd.	443
Steel, J. H., & Co. Ltd.	Cover iii (11)
Steele & Cowlishaw Ltd.	v (8)
Stocker, W. B., & Co. Ltd.	vi (10)
Storeys of Lancaster	vii (10)
Stott, James, Ltd.	v (10)
Sutcliffe Engineering Components Ltd.	405
Sutcliffe Speakman & Co. Ltd.	345
Swinnerton, S. & J. H., Ltd.	—
Tanner Bros. (Greenfield) Ltd.	ii (10)
Tilghman's Ltd.	—
Union Carbide Ltd.	iv (8)
United Norit Sales Corporation Ltd.	v (6)
United Wire Works Ltd., The	iii (11)
Universal Oil Co. Ltd.	269
Universal Oil Products Co.	420-421
Vacu-Blast Ltd.	ix
Verson Engineering Co. Ltd.	293
Vulcan Equipment Co. Ltd.	—
Wallace, H. W., & Co. Ltd.	322
Wallis Engineering Co.	173
Welwyn Tool Co. Ltd.	443
Wiggins, Teape Group, The	—
Witco Chemical Co. Ltd.	424, 432
Zama Ltd.	353

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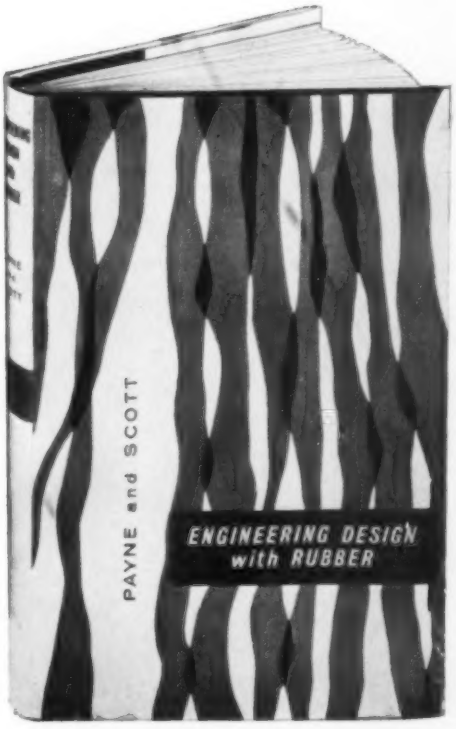

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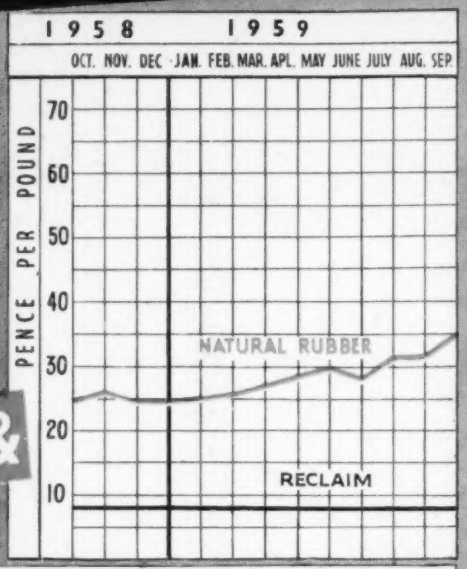

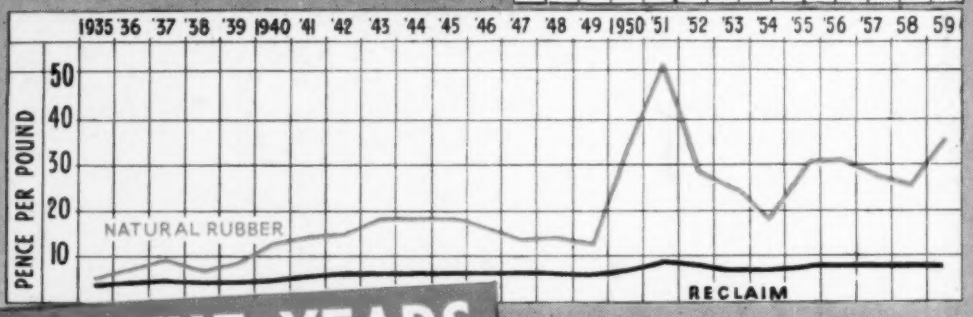

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